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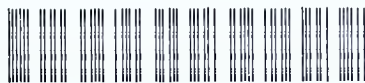
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COMMISSION REVIEW OF SIGNATORY PARTIES
LAWS AND REGULATIONS
RELATING TO
UNDERGROUND WASTE DISCHARGES

SUSQUEHANNA RIVER BASIN COMMISSION

JANUARY 13, 1977



03-40-831-8

The Susquehanna River Basin Commission was created as an independent agency by a Federal-Interstate Compact* among the States of Maryland, New York, Commonwealth of Pennsylvania and the Federal Government. In creating the Commission, the Congress and State Legislatures formally recognized the water resources of the Susquehanna River basin as a regional asset vested with local, State and National interests for which all the parties share responsibility. As the single Federal-Interstate water resources agency with basinwide authority, the Commission's goal is to effect coordinated planning, conservation, management, utilization, development and control of basin water resources among the government and private sectors.

SUSQUEHANNA RIVER BASIN COMMISSION

Hugh L. Carey
Governor of New York

Alternate: Dr. Theodore L. Hullar
Dep. Commissioner for
Programs and Research
New York DEC

Marvin Mandel
Governor of Maryland

Alternate: Henry Silbermann
Asst. Secretary for Environmental Matters
Maryland DNR

Milton J. Shapp
Governor of Pennsylvania

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Secretary
Pennsylvania DER

Thomas Hleppe
U.S. Secretary of the
Interior

Alternate: Thomas C.H. Webster
U.S. Commissioner
Susquehanna River Basin
Commission

Robert J. Bielo
Executive Director

* Statutory Citations: Federal - Pub.L. 91-575, 84 Stat. 1509 (December, 1970); Maryland - Natural Resources §8-301 (Michie 1974); New York - ECL §21-1301 (McKinney 1973); and Pennsylvania - 32 P.S. 820.1 (Supp. 1976).

COMMISSION REVIEW OF SIGNATORY PARTIES
LAWS AND REGULATIONS
RELATING TO
UNDERGROUND WASTE DISCHARGES

PREPARED BY:

STANLEY E. RUDISILL
BIOLOGIST
AND SRBC STAFF

SUSQUEHANNA RIVER BASIN COMMISSION
5012 LENKER STREET
MECHANICSBURG, PENNSYLVANIA 17055



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I. INTRODUCTION

Review Authority

The Susquehanna River Basin Compact assigned the Commission a regulatory role to review certain types of proposed projects. In general, Section 3.10 provides that the Commission's review authority extends to (1) projects that may have an interstate effect on the water resources of the basin and (2) projects that would affect immediate and long-range alternatives for the management, development, conservation, or utilization of the basin's water resources. When regulations governing Commission review procedures were adopted, it was recognized that agencies of the signatory parties would exercise their review authority and evaluate many of the proposed projects. To avoid duplication of work and enhance intergovernmental cooperation, the Commission executed agreements of understanding with appropriate agencies of the signatory parties that provide for joint review of projects and acceptance of signatory review. A permit issued by a signatory agency is considered Commission approval if issued pursuant to such an agreement of understanding.

In implementation of its review authority, the Commission, from time-to-time, directs the staff to evaluate various review programs of signatory agencies to assure compatibility with the Comprehensive Plan and other Commission policies.

Background

Since the adoption of its regulations for project review, it was noted through the joint review of projects that a large

number of discharges to the groundwater are being permitted by the signatory parties. Because of the concern for the impact upon the groundwaters of the basin, the Commission directed SRBC staff to review and evaluate the rules, regulations and programs of the signatories on underground discharge of wastewater to assure that management practices are compatible with the intent of the Compact, the Comprehensive Plan and other Commission policies.

The report is primarily concerned with underground discharges of liquid wastes; therefore, the impact on groundwaters of solid waste disposal practices is not discussed. Mining within the basin occurs in Pennsylvania only and the Department of Environmental Resources has stringent controls over such operations. To the best of the staff's knowledge (after conversations with signatory staff) there was only one small oil and gas operation within the basin in Pennsylvania; therefore, this type of operation was not discussed. This report summarizes the laws, regulations, and policies of the signatory members used to evaluate proposed waste discharges to basin groundwaters. Conclusions and recommendations are presented for Commission consideration based upon the results of the staff review.

Acknowledgement

The Commission gratefully acknowledges the permission granted by the Bureau of National Affairs, Inc., to reproduce excerpts from the Environmental Reporter for use as Appendices in this report.

II. IMPORTANCE OF GROUNDWATER IN THE BASIN

Groundwater is an important natural resource in the Susquehanna River Basin. More than two million people in the basin rely on groundwater for water supply. Of the 532 public water systems in the basin serving 540,000 people, 75 percent of those systems rely on groundwater sources. Approximately 1.5 million people are dependent on individual sources. Figure 1 illustrates the percentage of residents relying on groundwater sources by subbasin, while Table 1 describes the water use characteristics by State and subbasin.

The projected water withdrawals within the basin show a 43 percent increase (Table 2). While the trend for groundwater withdrawals is not mentioned specifically, it can be expected to increase. The increase will occur not only from a general increase in water usage, but also due to the implementation of the Safe Drinking Water Act (SDWA). Users of surface waters, especially where the waters receive industrial effluents, may be forced to use groundwaters in order to meet the stringent SDWA standards.

The protection of groundwater is important not only from a water supply aspect but also from its effects on surface water quality. During low flow periods, nearly 100 percent of the surface water is a result of groundwater contributions. Groundwater contamination can result from numerous sources. In the Susquehanna River Basin the most common cause is malfunctioning or poorly located septic systems. Other sources of potential

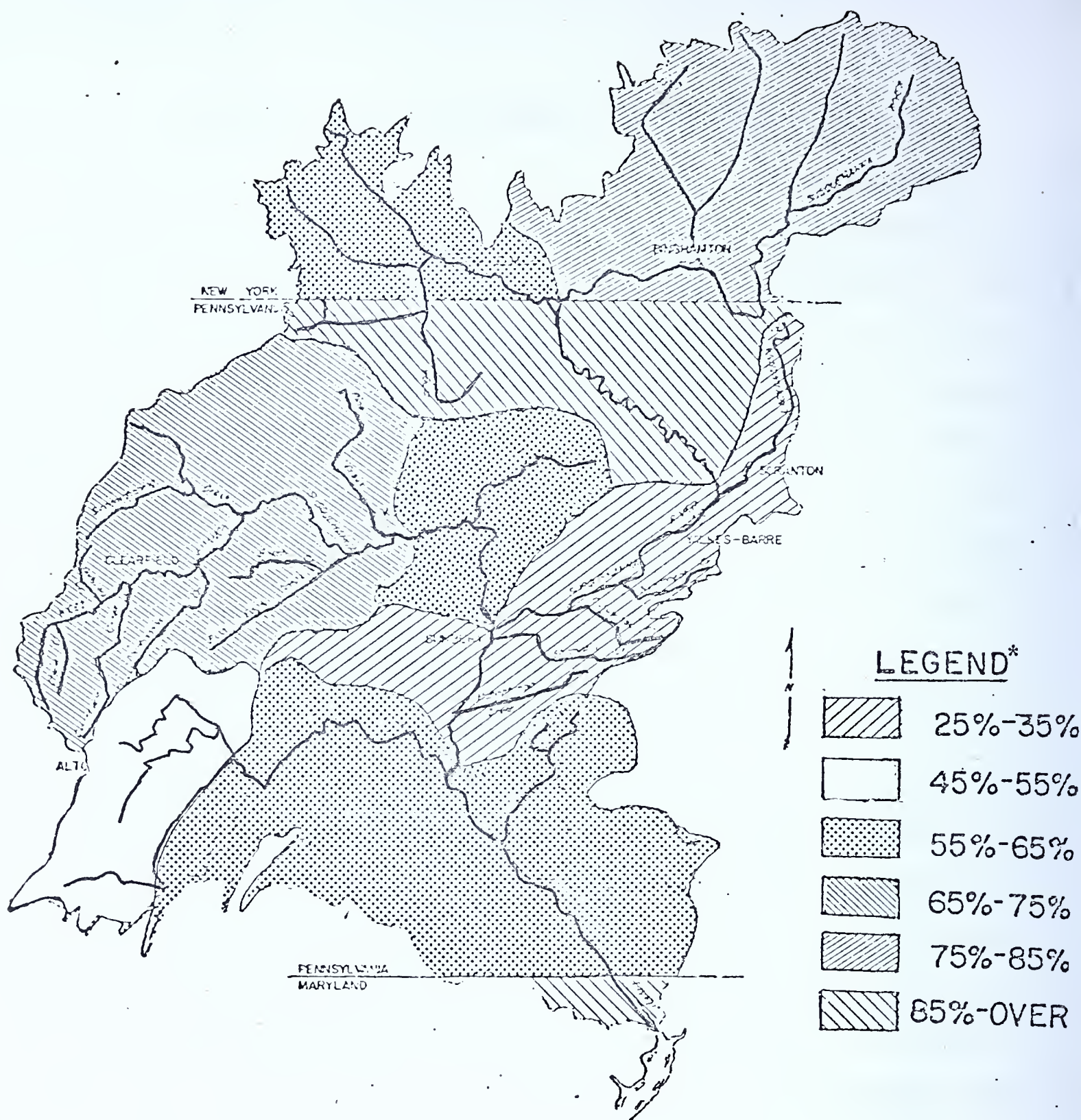


FIGURE 1 --

PERCENTAGE OF RESIDENTS RELYING ON
GROUND WATER SOURCES FOR DOMESTIC
SUPPLY IN THE SUSQUEHANNA RIVER
BASIN.

* Data derived from information provided by N.Y. DEC, Pa. DER, and Md. DNR.

TABLE 1

DOMESTIC WATER USE CHARACTERISTICS IN THE
SUSQUEHANNA RIVER BASIN

State and Subbasin	Total Population (1000)	Total No. of Public Water Supply Systems	Sources		Population Served (1000)		Self Supplied Domestic (1000)	Total GW Sources (1000)	Percent Of Tot. Pop. Using GW
			Surface	GW	Total	Surface			
<u>New York</u>									
Eastern Chemung	452 <u>210</u>	69 <u>29</u>	18 <u>4</u>	51 <u>25</u>	253 <u>145</u>	100 <u>86</u>	199 <u>65</u>	352 <u>124</u>	78% <u>60%</u>
<u>SUBTOTAL</u>	662	98	22	76	398	186	264	476	73%
<u>Pennsylvania</u>									
Main Stem Sus. R.	2,094	271	60	211	1,230	1,008	864	1,086	52%
West Br. Sus. R.	417	96	32	64	225	148	192	269	65%
Juniata River	292	60	18	42	158	135	134	157	54%
<u>SUBTOTAL</u>	2,803	427	110	317	1,613	1,291	1,190	1,512	54%
<u>Maryland</u>									
<u>SUBTOTAL</u>	60	7	--	7	7	--	53	60	100%
<u>TOTAL</u>	3,525	532	132	400	2,018	1,477	1,507	2,048	58%

Note: This table was compiled by SRBC with data supplied by: the N.Y. Dept. of Environmental Conservation, the Pa. Dept. of Environmental Resources, and the Md. Dept. of Natural Resources.

groundwater contamination include: subsurface industrial discharges, leachate from landfills, infiltration from unlined waste lagoons, infiltration of pollutants from ground surface (land disposal of sewage sludge and/or effluent, land application of agricultural chemicals, runoff from highway salting, etc.), and mine drainage.

TABLE 2

1970 AND PROJECTED 1990 PRELIMINARY WATER SUPPLY WITHDRAWALS
IN THE SUSQUEHANNA RIVER BASIN*

ITEM	1970 WITHDRAWALS (mgd)				PROJECTED 1990 WITHDRAWALS	
	Surface	Ground- water	Total	Percent of Total Use	Preliminary 1990 (mgd)	Percent of Total Use
Municipal	300	101	401	44	473	37
Industrial	180	161	341	38	394	30
Rural Domestic	2	68	70	8	111	9
Livestock	4	26	30	3	40	3
Irrigation	<u>55</u>	<u>10</u>	<u>65</u>	<u>7</u>	<u>275</u>	<u>21</u>
TOTALS	541	366	907	100	1,293	100

* Out-of-basin diversions and water withdrawals for power generation have been excluded.

Note: This table was compiled by SRBC with data supplied by: the N.Y. Dept. of Environmental Conservation, the Pa. Dept. of Environmental Resources, and the Md. Dept. of Natural Resources.

III. SUMMARY OF LAWS AND REGULATIONS
REGARDING UNDERGROUND DISPOSAL OF WASTEWATERS
IN THE SUSQUEHANNA RIVER BASIN

FEDERAL LAWS

The Federal Water Pollution Control Act Amendments and the Safe Drinking Water Act authorize Federal action to protect the nation's water resources.

Federal Water Pollution Control Act (P.L. 92-500)

Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500) - Section 304(e) requires the Administrator, EPA, after appropriate consultations with other agencies and interested persons, to issue information on processes, procedures and methods to control pollution from the disposal of pollutants in wells or in subsurface excavations within one year after the effective date of this section and Section 304(h)(2) requires that, within sixty days after enactment of Title III "Standards and Enforcement," the Administrator promulgate guidelines establishing the minimum procedural and other elements of any State program under Section 402(b) of the Act which shall include:

- a. Monitoring requirements;
- b. Reporting requirements;
- c. Enforcement provisions; and
- d. Funding, personnel qualification and manpower requirements.

Any applicant for a Federal permit must provide the licensing agency with a certification from the State in which discharge will occur that any such discharge will fully comply with all applicable standards and effluent standards. After promulgation of the guidelines required by the Act, the Governor of each State may apply for authority to administer its own permit program for discharges into navigable waters within its jurisdiction. The applicant must submit a full and complete description of the program it proposes to administer and a statement from the State Attorney General that the laws of the State provide adequate authority to carry out the described National Pollutant Discharge Elimination System (NPDES) program which includes control of the disposal of pollutants into wells.

Environmental Protection Agency Regulations on Policies and Procedures for the "National Pollutant Discharge Elimination System" (NPDES) prescribes the policy and procedures to be followed in connection with applications for Federally issued permits for discharges into navigable waters during the periods that the Administrator of the Environmental Protection Agency is authorized to issue permits [40 CFR 125.2(a)(1)]. The NPDES program developed by the States and approved by the Administrator, EPA, does require a permit issuance procedure for subsurface discharges, but the NPDES as administered by the EPA does not include a permit issuance procedure for subsurface discharges.

National Pollutant Discharge Elimination System Regulations

"Environmental Protection Agency Regulations on State Program Elements Necessary for Participation in the National Pollutant Discharge Elimination System" require control of disposal of pollutants into wells. This regulation requires that States participating in the NPDES program have procedures to control disposal of contaminants to wells. The guidance for permit issuance was included in the "Environmental Protection Agency Administrator's Decision Statement No. 5 on Subsurface Emplacement by Well Injection." Briefly, the Policy Statement specifies that (1) reasonable alternative methods be explored, (2) technical evidence be available to demonstrate that injection will not interfere with present or potential uses, (3) provisions for monitoring be made, and (4) contingency plans are adequate. The statement also indicates that such disposal methods are only temporary until new technology becomes available. An attachment to the Administrator's Decision Statement No. 5 is the "Recommended Data Requirements for Environmental Evaluation of Subsurface Emplacement of Fluids by Well Injection." This attachment includes the parameters which should be provided by the discharger and should contain sufficient information on which to evaluate the environmental impact of the discharge.

Safe Drinking Water Act (P.L. 93-523)

The purpose of the Act is to assure that water systems serving the public meet minimum national standards for protection of public health. It authorizes the Environmental Protection Agency (EPA) to (1) establish Federal standards for protection from all harmful contaminants, which standards would be applicable to all public water systems, and (2) establish a joint Federal-State system for assuring compliance with these standards and for protecting underground sources of drinking water. The Act requires EPA to prescribe national primary drinking water regulations for contaminants which may adversely affect the public health. The regulations apply to public water systems to protect health to the maximum extent feasible. The regulations are to include a maximum contaminant level, if it is feasible to monitor the level of that contaminant, or treatment technique requirements, if such monitoring is not feasible for that contaminant.

Part C of the Act provides for "Protection of Underground Sources of Drinking Water" and establishes a Federal-State system to assure that drinking water sources, actual and potential, are not rendered unfit by underground injection of contaminants. Underground injection is defined in the Act as "the subsurface emplacement of fluids by well injection"; contaminant means any "physical, chemical, biological, or radiological substance or matter in water" which, in the judgement of EPA, "may have any adverse effect on the health of persons."

The Act seeks to have the States assume the primary enforcement responsibility for controlling underground injections. EPA is directed to list States (anticipate all States) which ought to have underground injection programs. Each State listed must adopt an underground injection control program which meets the requirements of EPA. If a State's program is not submitted or disapproved, EPA is authorized to develop a program for the State and to enforce it, if necessary. The States that intend to assume the primary enforcement responsibility must submit their proposed underground injection control programs within 270 days after EPA has established guidelines that State programs must satisfy.

The guidelines for the States' regulatory programs have been drafted and circulated in the Federal Register (August 31, 1976), however, they have not been adopted as of this writing. According to the Act, the EPA guidelines for State underground injection control programs must, as a minimum, require States to (1) prohibit unauthorized underground injections effective three years after enactment of this bill; (2) require applicants for underground injection permits to bear the burden of proving to the State that its injection will not endanger drinking water sources; (3) refrain from adopting regulations which either on their face or as applied would authorize underground injection which endangers drinking water sources; (4) adopt inspection, monitoring, recordkeeping, and reporting requirements; and (5) apply their injection control programs to underground injections by Federal

agencies and by any other person whether or not occurring on Federally-owned or leased property. The adoption of the guidelines has been delayed due to difficulty in deciding which specific discharges should be regulated.

The most recent draft of the proposed regulations dated August 31, 1976 (Appendix A) would apply to those underground injection practices including ... "any bored, drilled or driven well, or dug well where the depth is greater than the largest surface dimension, whenever the principal function of the well is the subsurface emplacement of fluids." The proposed regulations do not include septic systems, landfill leachate, and other discharges which cannot be considered injection. Also, the draft regulations exclude from coverage, for at least two years after the effective date of the initial underground injection control (UIC) regulations, pits, ponds and lagoons used for storing and disposing of wastes. It is EPA's intent to gather enough data during the two-year period to determine how to regulate these disposal methods.

Under the proposed regulations monitoring, recordkeeping and reporting procedures will be the responsibility of the participating State. The permittee will be required to maintain records of all information resulting from monitoring activities and retain the records for a minimum of five years after the well is abandoned. Any participating State must require periodic reporting not less than once-per-year. Procedures which enable the State

agency to enter any premises in which a source of contaminant is located or in which records are required to be kept under terms or conditions of a permit and otherwise to be able to investigate, inspect or monitor any suspected violations shall be included in the regulations. State agencies participating in the underground injection control program will support permit issuance with inspection and surveillance procedures which will determine, independent of information supplied by applicants and permittees, compliance or noncompliance. The program will also contain a supporting inspection program for periodic inspection of underground discharge of contaminants.

The Safe Drinking Water Act was designed to protect groundwaters with a dissolved solids concentration up to 10,000 mg/l. One or more aquifers, with concentrations less than 10,000 mg/l, may be excluded from protection if it can be demonstrated that the aquifer is not a potential public water supply source because the aquifer is (1) oil-producing, (2) too contaminated, or (3) located such that it would be impracticable to use. Within three years no discharges will be allowed without an underground injection control permit. To obtain a permit the applicant must show that such an injection will not endanger drinking water sources and that injection is the most acceptable environmental alternative. The permit's duration shall not exceed five years. State permits which have been issued for underground injections under the guidelines of the EPA Administrator's Decision Statement No. 5 issued pursuant to P.L. 92-500 will be considered as permits under SDWA until they expire at which time an UIC permit will be required.

NEW YORK LAWS

The statutory authority for New York's groundwater classifications and standards is the New York Environmental Conservation Law (Articles §§ 15-0313 and §§ 17-0301). The law requires DEC to classify the State waters in accordance with considerations of best usage. The law also requires DEC to set standards of "quality and purity" for each classification.

New York's Department of Environmental Conservation is revising its groundwater standards. The draft regulations are currently undergoing in-house review. The following summary is based on existing guidelines.

Permit System

The New York State Permit Discharge Elimination System (SPDES) requires a permit for all industrial discharges and all sanitary discharges over 1,000 gallons per day as covered by Part 751, Chapter X, Division of Water Resources, Title 6, Environmental Conservation. Part 751.3 (iii) gives local agencies the authority to adopt and enforce ordinances and regulations to control sewage discharges of less than 1,000 gallons per day. Small septic systems are regulated by county health departments. A SPDES permit is required for a subdivision of land consisting of five or more parcels of land each of which is less than 10 acres in size which are hereafter divided from any single tract of land for sale or for rent for any purpose which involves or may involve the disposal of sewage to the waters of the State other than from a treatment works or other community

system, regardless of how such parcels are described and regardless of whether or not there are other parcels divided from such tract which are 10 acres or more in size.

New York has no specific regulations for deep well injections. They do have a policy (Appendix B) for regulating such practices. Extremely stringent standards have resulted in few permits for deep well injection. No such permits have been issued for the Susquehanna River Basin in New York.

Groundwater Classifications and Standards

The New York Department of Environmental Conservation has developed three groundwater classifications based on best usage (Section 17-0301, Title 6, Part 703, New York Code):*

GA - Fresh groundwaters with a chloride concentration less than 250 mg/l and a dissolved solids concentration less than 1,000 mg/l. The best use of this water is a potable water supply.

GSA - These are saline waters which have a chloride concentration more than 250 mg/l and a dissolved solids concentration greater than 1,000 mg/l. The water is best used as a source of saline waters for potable mineral waters, for conversion of fresh potable waters, or as raw material for manufacture of sodium chloride.

GSB - These saline waters having concentrations of chloride over 1,000 mg/l or dissolved solids greater than 2,000 mg/l which are best used as receiving waters for disposal of wastes.

* See Appendix C.

Class GA is the only classification with specific numerical standards. This class is subdivided into Conditions I and II based on aquifer conditions (see Part 703.4, Appendix C). Condition II uses drinking water standards as its criteria, with slightly lower standards for Condition I. Class GSA has no numerical standards but prohibits discharges which impair best use (while the best use for GSB is for waste disposal and the only criteria is that no discharge be detrimental to public health or safety). The latter two classifications, GSA and GSB, require establishment of standards on a case-by-case basis.

PENNSYLVANIA LAWS

The Commonwealth of Pennsylvania legislature passed two laws designed to protect the water resources of Pennsylvania. These laws are: a) Clean Streams Law [35 P.S. §§ 691.1 et seq. (Supp. 1976)], and b) Sewage Facilities Act [35 P.S. §§ 750.1 et seq. (Supp. 1976)].

Clean Streams Law and Sewage Facilities Act

The Pennsylvania Clean Streams Law and the Pennsylvania Sewage Facility Act provide the legal authority for the Department of Environmental Resources (DER) to regulate subsurface discharges. The Clean Streams Law defines "waters of the Commonwealth" as "... surface and groundwater...." The Act gives DER the authority and power to conduct "water quality management and pollution control ..." and requires the promulgation of regulations and policies. This Act covers both sewage and industrial waste discharges. The Sewage Facilities Act has been established to provide "for the planning and regulation of community sewage

systems and individual sewage systems ..." and authorizes ... DER to adopt and administer rules, regulations, standards and procedures"

Regulations and Permits

Pertinent regulations promulgated under the Clean Streams Law (§§ 97.1-97.76) include:

(1) consider underground discharges as potential pollution,

(2) prohibit discharging inadequately treated wastes to underground workings of mines,

(3) prohibit discharge to abandoned wells, and

(4) prohibit discharge to underground horizons unless applicant can show that "it is improbable that the disposal would be prejudicial to the public interest."

Regulations require a permit for any industrial discharge to "waters of the Commonwealth." A permit must also be obtained from DER for any subsurface sanitary discharge over 10,000 gallons per day. Pennsylvania regulations do not classify groundwaters.

The regulations promulgated under the Pennsylvania Sewage Facilities Act are designed to prevent health hazards from poorly constructed on-lot sewage disposal systems. Installation of all subsurface sanitary discharge systems requires a permit (except for rural residences). The local authority issues the permit through a "sewage enforcement officer" who is certi-

fied by DER. The local sewage enforcement officer can issue permits for subsurface sanitary discharges up to 10,000 gallons per day. Larger discharges require a permit from DER. The regulations specify the type of disposal systems that are suitable for the certain soil and topography conditions.

MARYLAND LAWS

The "Water Pollution Control and Abatement" section of Maryland's Water Pollution Control Law provides for joint powers and duties of the Department of Health and Mental Hygiene and the Department of Natural Resources. By Administrative agreement, the Department of Health is responsible for all sanitary discharges which use soil absorption systems. The Water Resources Administration is required to:

a. develop comprehensive programs and plans to prevent, control and abate pollution of the waters of the State;

b. adopt, modify, repeal, promulgate and enforce rules and regulations implementing or effectuating its powers and duties;

c. issue, modify or revoke orders and permits prohibiting discharges of pollutants into the waters of the State, or require construction, modification, extension or alteration of new or existing disposal systems or treatment work or adoption of other reasonable remedial measures to prevent, control or abate pollution or undesirable change in the quality of the waters of the State; and

d. establish rules and regulations for filling and sealing

abandoned water wells and holes, disposal wells, and both deep and surface mines, and for landfills to prevent groundwater contamination, seepage, and drainage into the waters of the State.

The law requires that the Water Resources Administration establish rules and regulations regarding the application for issuance, recision or modification of discharge permits, maintenance of records and monitoring. This section stipulates that issuance of the permit is contingent upon granting the Water Resources Administration the right to enter the permitted site at any reasonable time to inspect and investigate for actual or potential violations of the conditions of the permit (§§ 8-1413).

Maryland's Department of Natural Resources (DNR) is currently in the process of rewriting its regulations and standards regarding subsurface waste disposal. Some upgrading may result, but no major changes are expected.

Regulations

The discharge permits section specifies in part that no person shall, except as authorized by a State Discharge Permit (also NPDES) issued by the Water Resources Administration:

- a. discharge any waste or wastewater regardless of volume; and
- b. construct, install, modify or operate any system for disposal of waste or wastewater, or a system which may result in a discharge into the waters of the State regardless of quality or volume, except stormwater runoff.

Criteria for issuance of discharge permits include compliance of all applicable requirements of effluent limitations, receiving water quality standards, groundwater quality standards established by the State and Federal and State laws and regulations. Additionally, publicly-owned treatment facilities should comply with the Basin Water Quality Management Plan and approved County Water and Sewerage Plans.

The regulations also require that any discharge authorized by the State Discharge Permit shall be subject to whatever monitoring requirements the Water Resources Administration deems necessary. The permittee shall maintain records of monitoring activities and results for a minimum of three years.

Groundwater Quality Standards

Maryland Groundwater Quality Standards (Appendix D) identify three aquifer types based on the transmissivity, permeability and the total dissolved solids concentration for natural water in the aquifer. It established the following discharge quality requirements:

a. Type I aquifer - the characteristics of the discharge into the aquifers may not exceed or cause natural groundwater quality to exceed standards for drinking water established by the Federal Government;

b. Type II aquifer - the characteristics of the discharge into the aquifer may not exceed or cause natural ground-

water quality to exceed surface water quality standards established for Class I waters (water contact and recreation) by the State; and

c. Type III aquifer - the characteristics of the discharge will be identified and evidence shall be provided that the discharge will not pollute the Type I or Type II aquifers, or surface waters and that public health and welfare will not be endangered.

IV. DISCUSSION

The review and comparison of the laws and regulations of the signatory parties regarding underground disposal of waste water is hindered by the lack of uniform terminology. Many of the terms specifically defined by each agency vary significantly. For example, the State of New York defines the term "disposal system" as "a system for disposing of sewage, industrial waste or other wastes and including sewer systems and treatment works." The Commonwealth of Pennsylvania does not define the same term "disposal system", but defines several specific terms such as "individual sewage system", "septic tank", "subsurface leaching system" and "subsurface sewage disposal system". "Subsurface sewage disposal system", the most general of the Pennsylvania terms listed above, is defined as "an installation used to treat and dispose of sewage, which uses the ability of the soil to absorb sewage." The State of Maryland defines "disposal system" as "a system for disposing of wastes, either by surface or underground methods, and includes treatment works, disposal wells and other systems. With the exception of the State of Maryland's mention of disposal wells and the EPA proposed regulations on State Underground Injection Control Programs, specific definitions for disposal systems other than septic tank type systems are not provided. However, the definitions of "Waters of the State" for each of the signatory states include all surface water and groundwater within the boundaries of the state, therefore, the prohibition

of discharges into the waters of the signatory states without a discharge permit would apply to all types of underground disposal, with the exception of small volume sanitary wastes in New York. New York State has the authority to protect all waters of the State, but does not have authority to issue permits to control all discharges to the groundwaters of the State. The option to permit small sanitary waste discharges is left to the local authorities.

Lack of uniformity in groundwater classifications and regulations for underground disposal of wastewater standards also creates comparison difficulty. The State of New York classifies its groundwater into three classes of best usage according to the chloride and total dissolved solids content: Class GA - fresh groundwater for potable water supply; Class GSA - saline waters for production of potable mineral waters, for conversion to fresh potable water or for manufacture of sodium chloride or similar products; and Class GSB - saline waters best used as receiving waters for disposal of wastes. The Commonwealth of Pennsylvania considers all of its groundwater as potable water supply sources. The State of Maryland classifies groundwater into three aquifer types (I, II and III) according to transmissivity and permeability and the total dissolved solids content.

The State of New York has established effluent discharge standards that list maximum concentrations for certain speci-

fic contaminants for discharges into potable groundwaters (Class GA) according to the depth to the water table and the type of materials in which the aquifer is located. For Class GSA (saline water for potable mineral water) the standards require that no contaminants be discharged in such manner and amounts as to impair best usage and for Class GSB (receiving waters for waste) none which are detrimental to public health, welfare or safety and only on permit by the State. The Commonwealth of Pennsylvania does not have specific standards for discharge to groundwater. The State of Maryland has established discharge quality standards as follows: (1) Type I aquifer - characteristics of wastewater discharged may not exceed or cause the natural groundwater quality to exceed standards for drinking water established by the Federal government; (2) Type II aquifer - characteristics of wastewater may not exceed or cause the natural groundwater to exceed receiving (surface) water quality standards as established for Class I (recreation) waters by the State. In addition, such discharges should not pollute Type I aquifers; (3) Type III aquifer - characteristics of wastewater will be identified to the Water Resources Administration and evidence provided to show that Type I and II aquifers or surface waters will not be polluted. Public health and welfare shall not be endangered as a result of such disposal.

Although the State of New York and Maryland have groundwater classifications, their classification of groundwaters differs from the requirements of the Safe Drinking Water Act (SDWA). The SDWA requires protection of all groundwater with less than

10,000 mg/l total dissolved solids as potential drinking water sources. New York State has three groundwater classifications specified in the state law, however, all groundwaters of the State are currently classified as potential drinking water sources (either Class GA or GSA). In practice, the State's requirements are more stringent than the Federal requirement. The third classification (Class GSB) is a specialized class reserved for the disposal of wastes to saline groundwaters having a total dissolved solids content greater than 2,000 mg/l, but only as a last resort when no other means of disposal is feasible. Currently, no groundwaters are classified GSB in New York State.

The State of Maryland does not specifically classify aquifers as drinking water sources, but the discharge standards imply that Types I and II aquifers are potential drinking water sources. However, the total dissolved solids criteria protects a smaller number of aquifers than the Federal requirement.

Pennsylvania considers all groundwater as potential sources of drinking water and is therefore more stringent than the Federal requirement.

All of the States require the counties to develop comprehensive water and sewerage plans. In New York State, Comprehensive Sewerage Plans are binding only on municipal sewerage facilities that are built with State or Federal grants-in-aid. All private sewerage facilities and all non-grant municipal facilities must abide by Section 303(e) basin plans (stream standards and waste

load allocations) but they do not have to conform to county Comprehensive Sewerage Plans or to Section 208 plans for Areawide Wastewater Management. The applicant must conform to these plans with regard to site location and provide the information (i.e. soil type, percolation rate, depth to water table) used to determine the suitability of the disposal site. Each of the responsible agencies use the data provided to evaluate the suitability for on-lot disposal. Written regulations requiring verification of the data provided for sanitary wastes disposal sites was available only for the Commonwealth of Pennsylvania. The Pennsylvania regulations for administration of the Sewage Facilities Act require the Sewage Enforcement Officer to personally conduct or verify site suitability tests.

The requirements for on-lot disposal of industrial wastes is similar for all States. New York and Pennsylvania rely heavily on information provided by the applicant to evaluate site suitability, while Maryland conducts an on-site field investigation for all proposed subsurface industrial discharges. Routinely, all State rely on the applicant to provide the information (character of wastes, site suitability, etc.) necessary for processing a permit application without verification.

The existing requirements of each signatory state appear to be adequate for protection of the groundwaters from deep well injection of wastewaters. The current practice of each State is to evaluate permit applications on a case-by-case basis through the existing waste discharge permitting system.

V. CONCLUSIONS, FINDINGS & RECOMMENDATIONS

From review of the laws and regulations, the existing requirements of each signatory party appear adequate for the protection of the groundwater aquifer from deep well injection of wastewater. It cannot be concluded, however, that the regulations sufficiently protect the groundwater aquifers from shallow well wastewater disposal.

Of potentially greater significance, however, is the capability of each member to effectively implement either existing or new regulations and programs aimed at improving the protection of groundwaters from underground discharge of wastewater. Budget and staff limitations were cited as or are known to be constraints in on-site inspections related to permit issuance and follow-up compliance monitoring and surveillance. Also, the present system of evaluating projects and permits on a case-by-case basis by each member (and Commission staff) fails to recognize and address cause-effect relationships on the total basin groundwater resource. It is possible, therefore, that in the near future the members or the Commission may be obliged to embark on an interstate management program designed to protect and regulate the groundwater resources of the basin for domestic and industrial water users.

From staff experience in reviewing signatory member permits for underground waste disposal, several areas of inadequate regulation have been noted.

Finding (1) :- Past permit applications for industrial

wastes have, in some cases, provided inadequate information on the characteristics of the waste, description of the subsurface environment and the design of disposal systems.

Recommendation (1) -- Where underground waste disposal is planned, more stringent requirements should be imposed in the submission of information on waste characteristics, subsurface environment, and design of disposal systems as part of the permit application.

Finding (2) -- Frequently an applicant is required to perform compliance monitoring with little or no outside verification. This presents a potential problem, especially if dischargers do not have trained personnel or adequate laboratory facilities to reasonably monitor waste discharges.

Recommendation (2) -- Regulatory agencies require that all analyses of wastewater be conducted by a certified laboratory. Periodic surveillance monitoring by regulatory agencies is also necessary to verify self-monitoring results and assure compliance.

Finding (3) -- Evaluation of the disposal area is usually based upon information submitted by the applicant.

Recommendation (3) -- The permit application process should be less dependent on information provided by the applicant. An on-site evaluation should be conducted by the involved state where toxic or non-biodegradable substances are apt to be in the effluent.

Finding (4) -- Although the state regulatory agencies regulate the use and installation of on-lot septic systems,

there are no specific State requirements for dischargers (existing or new) to connect into sewage treatment systems. The adequacy of septic systems to treat some waste discharges described in permit applications reviewed by the Commission staff were questionable; however, because there were no specific regulations requiring connection to existing treatment systems for certain kinds or classes of wastes, State review recommendations were accepted.

Recommendation (4) -- All signatory parties aggressively encourage dischargers of wastewater that may contain toxic or non-biodegradable substances (and other wastewater dischargers) to avoid the use of septic systems where municipal sewage treatment systems are available. However, appropriate pre-treatment and stringent monitoring would be necessary to prevent substances from entering the system which are incompatible with municipal treatment processes.

Finding (5) -- Comments received by signatory states agreed in principle with the recommendation for more comprehensive on-site investigations and monitoring, but noted that funding and staff constraints limited their activities to higher priority projects. The importance of groundwater requires maximum assurances that these resources will be preserved for present and future uses.

Recommendation (5) -- Signatory states assure sufficient data is provided for evaluation of permit applications (for new and existing discharges) and compliance monitoring to rectify program budget insufficiencies. For example, they could require the

discharger to incur a portion of the cost through permit application and compliance monitoring fees, and/or require an applicant to hire a professional consultant to develop the necessary data for permit applications and compliance monitoring.

Finding (6) -- Each signatory state is currently in the process of reviewing existing laws and regulations with a view toward developing specific programs to improve regulation of underground disposal of wastes. Development of these programs may include the classification of underground aquifers that are interstate in nature.

Recommendation (6) -- The SRBC review the drafts of State proposals prior to adoption by the States to improve interstate compatibility and thereby achieve as much consistency as possible.

APPENDIX A

U.S. ENVIRONMENTAL PROTECTION AGENCY
PROPOSED REGULATIONS
STATE UNDERGROUND INJECTION CONTROL PROGRAMS
(41 FR 36730, AUGUST 31, 1976)

SOURCE: ENVIRONMENT REPORTER, BNA

ENVIRONMENTAL PROTECTION AGENCY PROPOSED REGULATIONS ON STATE UNDERGROUND INJECTION CONTROL PROGRAMS

41 FR 36730, August 31, 1976

[40 CFR Part 146]

[FRL 595-7]

STATE UNDERGROUND INJECTION CONTROL PROGRAMS

Proposed Regulations

INTRODUCTION

Notice is hereby given that pursuant to sections 1421, 1422, 1423 and 1450 of the Public Health Service Act, as amended by the Safe Drinking Water Act ("SDWA" or "the Act," Pub. L. 93-523), the Administrator of the Environmental Protection Agency (EPA) proposes to issue a new 40 CFR Part 146 setting forth regulations governing State underground injection control programs.

Approximately 100 million Americans are dependent upon drinking water from underground sources which have historically been relatively free from harmful contaminants. However, in recent years there has been increasing concern over the threat to public health posed by the underground injection of substances which degrade the quality of underground drinking water sources. As a result of this concern, Congress included in the Safe Drinking Water Act, enacted on December 16, 1974, a statutory mandate for the establishment of minimum requirements for effective State programs designed to protect underground drinking water sources from subsurface injection of contaminants.

The intent of the proposed regulations is to establish minimum requirements for effective State programs to protect existing and potential underground sources of drinking water from endangerment from underground injection of fluids.

It is clear from the Act and the legislative history of the SDWA that Congress intended that the States exercise primary enforcement responsibility for the protection of underground sources of drinking water to the extent possible. For this reason the regulations are designed to be administratively compatible with and non-duplicative of existing State programs. The regulations are intended to broaden and strengthen these existing State programs as well as to establish minimum national requirements which reflect good engineering practice.

It is also clear that many differences exist between States, including geological conditions, use and availability of ground water, and intensity of underground injection operations. For this reason the regulations are designed to allow a State to exercise maximum flexibility in order to prevent underground injection practices from contaminating drinking water sources.

LEGAL FRAMEWORK OF THE REGULATIONS

Section 1421 of the Act defines the basic requirements of EPA's regulations

for State underground injection control programs. The Administrator must promulgate regulations which contain minimum requirements for effective programs to prevent underground injection practices which endanger potential or present drinking water sources. In accordance with this mandate, the principal purpose of the regulations is to prevent endangerment of underground drinking water sources, and the burden is placed on the underground injection operator to demonstrate that his operation will not result in endangerment. Section 146.2(x) of the proposed regulations seeks to clarify what is meant by "endangerment" by defining that term to include the contamination or potential contamination of an aquifer which may result in the need for additional treatment of water from the aquifer to make it suitable for drinking. Comments on this definition and suggestions for alternative approaches are welcome. EPA believes that the definition of endangerment should be construed liberally so as to effectuate the preventive and public health protection purposes of the Act. Therefore, the proposed regulations seek to prevent the injection of materials which may enter a present or potential drinking water source and pose a threat to human health or otherwise render a present or potential water source unfit for human consumption. Necessarily, the regulations seek to pre-

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vent the injection of materials which may force a public water system to expend funds to comply with any national primary drinking water regulation or otherwise to avoid endangerment to the public health.

Section 1421(b)(2) states that regulations for State underground injection programs may not prescribe a requirement which interferes with or impedes underground injection in connection with oil and natural gas production or the secondary or tertiary recovery of oil and natural gas unless such a requirement is essential to assure that underground sources of drinking water will not be endangered by such injection. The House Report accompanying the Act defines the term "interfere with or impede" to mean "stop or substantially delay" (Report 93-1185, at 31).

The Administrator need not demonstrate that a particular requirement is essential unless it can be first shown that the requirement interferes with or impedes oil or gas production. As indicated in the House Report, the Administrator does not have an "impossible" burden in establishing the essentiality of a requirement. (Report 93-1185, at 31) Moreover, as discussed above, the Agency intends to interpret the term "endangerment" broadly so as to effectuate the purposes of the Act. Recognizing the complexity, intensity, age and experience in regulating injection operations as they relate to oil and gas production and the fact that several alternative methods have been demonstrated to be equally effective in protection of underground sources of drinking water proposed § 146.42(c) provides that a State Director may approve an alternative method of protection to specific minimum requirements contained in § 146.42(a), if the operator clearly demonstrates that (i) the requirement would stop or substantially delay oil or natural gas production at his site; and (ii) the requirement is not necessary to assure the protection of an existing or potential source of underground drinking water. Section 146.42(c) applies only to specific wells or injections. Section 146.42(b) provides that the Director may designate specific geographical areas where an alternative method to the requirements in § 146.42(a)(1) or (a)(2) may be employed.

Section 1422(a) of the Act requires the Administrator to list in the FEDERAL REGISTER those States for which a State underground injection control program may be necessary to assure that underground injection will not endanger drinking water sources. Such a determination will not be based on the adequacy of an existing State program but will be initially based on the dependency of a State on ground water as a source of drinking water and the magnitude of underground injection operations in a State. All States will eventually be listed. Under section 1422(b) of the Act, a State so listed must submit a State program to the Administrator within 270 days after being named. If the State program does not fully meet the requirements of the Act and applicable regulations, or if no State program is submitted, the Administrator must prescribe a program for the State within 90 days. The States will be listed within 90 days of the publication of this notice (40 FR 31034, July 24, 1975).

If a portion of a State's program meets the requirements of the Act and these regulations, that fact will be taken into account in the Administrator's prescription and administration of a program for the State. EPA will administer only that portion of an underground injection control program for the State for which the State's program is not adequate. However, section 1421 of the Act makes clear that the State cannot assume overall "primary enforcement authority" unless all of its program is approved by the Administrator. If a State does not assume primary enforcement responsibility, it cannot be awarded program grant funds related to an underground injection control program after an initial two-year period, and the Administrator will have direct enforcement authority in the State pursuant to section 1423 of the Act.

State underground injection control programs under section 1421 of the Act are considered separately from State public water system supervision programs under section 1413. A State does not have to qualify for primary enforcement responsibility for public water systems to qualify for primary enforcement responsibility for underground injection.

Section 1421 of the Act requires the Administrator to promulgate regulations establishing minimum requirements for the State underground injection control programs. Section 1421 also specifies some of those requirements. The regulations must require that a State program, to be approved under section 1422—

(A) Shall prohibit, effective three years after the date of the enactment of this title, any underground injection in such State which is not authorized by a permit issued by the State (except that the regulations may permit a State to authorize underground injection by rule);

(B) Shall require (i) in the case of a program which provides for authorization of underground injection by permit, that the applicant for the permit to inject satisfy the State that the underground injection will not endanger drinking water sources, and (ii) in the case of a program which provides for such an authorization by rule, that no rule may be promulgated which authorizes any underground injection which endangers drinking water sources;

(C) Shall include inspection, monitoring, recordkeeping and reporting requirements; and

(D) Shall apply (i) as prescribed by section 1447(b), to underground injections by Federal agencies, and (ii) to underground injections by any other persons whether or not occurring on property owned or leased by the United States.

Within the framework of section 1421(b), the Agency has based the proposed regulation on its review of thirty-one existing State programs and on technical and policy input from a diverse work group including four State officials (Texas, Kansas, Florida and Michigan), the U.S. Geological Survey, five regional EPA representatives (Regions VI, IX and X), three representatives from USEPA laboratories, and seven representatives from USEPA headquarters. Comments were also solicited from State program officials, industry representatives, and environmental groups.

SCOPE OF THE REGULATIONS

The Act defines "underground injection" as the "subsurface emplacement of

fluids by well injection" (Section 1421(d)(1)).

The scope of the coverage of these regulations is determined by the definition of "well injection." The term is not explicitly defined in the Act or the legislative history. Upon examination of the purpose and legislative history of the Act, EPA is including the following definition in proposed § 146.2(r):

Well injection means subsurface emplacement through a bored, drilled, or driven well, or through a dug well where the depth is greater than the largest surface dimension, whenever a principal function of the well is the subsurface emplacement of fluids.

The term "well injection" is defined in terms of the function of a well. As well as including what is normally referred to as the "deep well" injection of industrial or municipal wastes, the proposed definition of "well injection" also includes a number of well injection practices other than "deep well" waste disposal, including the subsurface emplacement of fluids generally, not just waste disposal. This definition is supported by the House Report, which states:

The definition of underground injection is intended to be broad enough to cover any contaminant which may be put below ground level and which flows or moves, whether the contaminant is semi-solid, liquid, sludge or any other form or state.

This definition is not limited to the injection of wastes or to injection for disposal purposes; it is intended also to cover, among other contaminants, the injection of brines and the injection of contaminants for extraction or other purposes. (Report 93-1185, at 31.)

The proposed definition includes drilled wells, since these are the type of wells used in the practices most often mentioned in the legislative history as requiring regulation. It also covers bored and driven wells, which are similar in concept and are used for the same purposes in appropriate situations.

The proposed definition includes dug wells in the definition of well injection practices only when the depth of the well is at least greater than the largest surface dimension of the well. Imposing this depth-width limitation is an effort to adhere to a common view of a well, that it is substantially deeper than it is wide.

Several factors were considered and rejected in the development of the definition of "well injection." For example, as noted in the legislative history above, the nature of the fluid emplaced is not a controlling factor. Also, the legislative history does not suggest that subsurface emplacement of fluids becomes "underground injection" at some predetermined depth below the surface.

A simple way to define "injection" in the context in which it is used in the statute would be to relate it to mechanically induced pressure. However, the clear purpose of the Act is to prevent the endangerment of underground drinking water sources through the injection of fluids, and there is no reason to distinguish between mechanical pressure and gravity flow injection.

The proposed definition does not cover practices which in many cases endanger underground drinking water because they cannot be deemed to be "underground injection" within the meaning of section 1421(d)(1) of the Act. For example, leakage from sewer mains, septic systems, highway salting and leaching

from landfills appear to be very serious sources of contamination of underground drinking water, but they are not underground injection practices and therefore are not regulated by Part C of the Act. It also does not cover a situation such as the construction of an oil or gas production well or those surface impoundments where incidental subsurface emplacement of fluids occurs but is not a principal function of the operation.

In § 146.2(r), the term "dug well" applies only to impoundments where the depth is greater than the largest surface dimension. However, the term "dug well" also can be applied technically to surface impoundments, such as pits, ponds and lagoons, where the depth is less than the largest surface dimension. (See *Meinzer, Outline of Ground-Water Hydrology with Definitions*). What is unclear is whether these dug wells which also have as a principal function the subsurface emplacement of fluids are also covered by the Act.

What is clear is that there are tens of thousands of dug wells—including industrial and municipal pits, ponds and lagoons used for waste treatment, storage or disposal—which pose a very serious potential hazard to underground drinking water. EPA proposes to attack the problem of these dug wells, including pits, ponds and lagoons, in the following manner:

1. Proposed § 146.16(b) requires States to undertake a survey of dug wells to determine the extent to which they function to emplace fluids underground and the hazards they pose to underground drinking water sources.

2. EPA will seek to obtain needed additional data on these dug wells through the study of pits, ponds and lagoons authorized by section 1442 of the Act.

3. When enough data is available to determine which dug wells should be regulated and how they should be regulated, EPA will endeavor to amend the definition of "well injection" to the extent possible to cover additional dug wells or will seek such additional legislation as may be necessary. It is EPA's intention that any broadening of the regulation of dug wells would not take effect for at least two years after the effective date of the initial underground injection control regulations, in the interest of orderly administration of the State programs.

However, it should be noted that EPA could act to prevent such endangerment under section 1431, the emergency powers provision of the Act. EPA is studying the effects of these and other sources of ground-water contamination. In the meantime, the States are encouraged to continue their efforts to regulate a broad range of sources of contamination which do not fall within the meaning of "underground injection" as that term is used in the Act.

Comments are encouraged on ways in which those dug wells which have as a principal function the underground emplacement fluids can be defined and included in an underground injection control program.

FRAMEWORK OF THE REGULATIONS

The regulations are established to provide the minimum requirements for

regulating the underground injection of fluids by the practice of well injection. The practices which are covered by the proposed regulations include injection through any bored, drilled or driven well, or any dug well, where the depth is greater than the largest surface dimension, whenever a principal function of the well is the subsurface emplacement of fluids.

This covers several hundred industrial and municipal waste disposal wells, wells used to inject materials into underground strata for storage, recharge wells, barrier wells, subsidence control wells, mining wells, geothermal wells, brine disposal wells, injection wells used in connection with oil and gas recovery, and drainage wells used for the purpose of disposal of storm water runoff and irrigation return flow.

The proposed regulations include three categories for different types of underground injection practices. Subpart C includes waste disposal wells, wells used to inject materials into underground strata for storage, recharge wells, barrier wells, subsidence control wells, geothermal wells and mining wells. Permits would be required for all such wells, although wells in existence on the effective date of the State program could be regulated by general rule for a period of up to five years pending review of the well by the State. Subpart D includes underground injection wells associated with oil and gas production. Owing to the unique nature and diversity of these wells, Subpart D allows greater flexibility to the States in regulating these wells. As in the case of Subpart C, a permit would be required for these wells also. Subpart E wells in existence on the effective date of the State program could also be regulated by general rule for a period of up to five years pending review of the wells by the State. Review of existing wells could be conducted on a field-by-field or similar approach by the State to simplify the permitting of existing wells and to avoid duplicative data requirements. Subpart E governs drainage wells. These wells can be regulated by permit or by rule, at the option of the State. Maximum flexibility is given to the States for regulation of these types of underground injection wells.

Comments are invited on the categorization of well injection practices used in the regulations and the adequacy of coverage of the regulations.

APPROVAL OF STATE PROGRAMS

Subpart B of the proposed regulations sets forth the procedures for the approval of State programs. Proposed § 146.10 lists the basic requirements for approval. One of those requirements is that a State program must follow the pattern of regulations by rule or permit established in Subparts C, D, and E. In other words, a State program must follow the requirements of Subpart C in its regulation of waste disposal wells and engineering wells. The State program regulating injection wells related to oil and gas production must follow the requirements of Subpart D. With respect to other types of injection wells, the State program may regulate by a permit system or by rules of general applicability or by a combination of the two, so long as it meets the minimum requirements of Subpart E.

Proposed § 146.12 sets out the requirements for an application for a State program. It is not intended that a State include all possible information about its program, but a State must submit the relevant State statutes and regulations and a description of the State's enforcement procedures. This includes designation of geographical areas under §§ 146.11 and 146.42(b).

Under proposed § 146.13, the Administrator will give public notice of a request for approval of a State program, and will invite comment. Action must be taken on the State application within 90 days after its receipt. Opportunity for public hearing is required by section 1422 (b)(4) of the Act.

Once a State program is approved by the Administrator, it will remain in effect until such time as the Administrator determines that the program no longer meets applicable requirements. To facilitate the Administrator's consideration of the continued compliance of a State program with applicable requirements, proposed § 146.15 requires that the State retain pertinent records on outstanding State-issued permits and on violations of State requirements. In addition, under proposed § 146.16 a State would be required to submit to the Administrator, for approval, information on any proposed material changes in the State program. This includes designation of geographical areas under §§ 146.11 and 146.42(b). The State also would be required to submit on April 1 of each year a brief annual report updating the State's inventory of underground injections (a summary, not a facility-by-facility description) and summarizing violations of State statutes and regulations and of enforcement actions taken by the State.

KEY PROVISIONS OF THE PROPOSED REGULATIONS

A. ENDANGERMENT OF DRINKING WATER SOURCES

The goal of any requirement for the protection of underground water sources is set by the statute as preventing the endangerment of drinking water sources. As provided by section 1421(d)(2) of the Act:

Underground injection endangers drinking water sources if such injection may result in the presence in underground water which supplies or can reasonably be expected to supply any public water system of any contaminant, and if the presence of such contaminant may result in such system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons.

The House Report accompanying the Act provides some guidance as to which underground water sources can reasonably be expected to supply any public water system. The Report indicates that any underground source with a level of total dissolved solids of 10,000 mg/l or less should be protected (Report 93-1185, at 32). Proposed § 146.2(g) defines underground drinking water sources accordingly. However, EPA believes that there should be some means of excluding individual aquifers or parts of aquifers which are not in fact potential sources of drinking water even though they have total dissolved solids levels of less than 10,000 mg/l. For example, an aquifer may be oil-producing even with a TDS level

of less than 10,000 mg/l, and in such a case it may be wise to give the oil-producing qualities of the aquifer precedence over its ability to provide drinking water. Also, some aquifers below the 10,000 mg/l level are so contaminated that as a practical matter they are not potential drinking water sources.

Because it would be a misallocation of resources to seek to protect as potential drinking water sources aquifers which in fact will not be used by public water systems, proposed § 146.11(a) provides that a State program may designate one or more aquifers or portions thereof in the State which have a TDS level below 10,000 mg/l but which will not be protected because they are oil-producing, are severely contaminated or located in such a way that use as drinking water is impracticable. The State must demonstrate by compelling evidence that an aquifer is and will continue to be unsuitable as a source of drinking water. As part of the State program, the designation would be subject to public notice and public hearing prior to submission to EPA. The regulations also provide, in § 146.11(b), that a State may designate geographical areas where no underground drinking water sources exist. In such geographical areas, the requirements of Subparts C, D, and E would not apply. Comment is requested on this approach to selecting aquifers which do not require protection as potential drinking water sources.

Once the aquifers to be protected are identified, the question remains as to the degree of protection to be given. The Act defines "endangerment of drinking water sources" to mean the presence of a contaminant which "may result in [a public water] system's not complying with any national primary drinking water regulation or may otherwise adversely affect the health of persons." In the case of existing system using an underground water source, the logical meaning of this provision is that contamination endangers drinking water if it requires the use of new or additional treatment by the system to meet a national primary drinking water regulation or otherwise to prevent a health risk. In many instances there would be a time lag between the time of contamination and the initiation of the new treatment. Diversion of water system resources to deal with such preventable contamination is an inefficient approach to the problem of providing safe drinking water to all persons.

The question of endangerment of underground drinking water sources is more difficult with respect to potential sources not currently used by public water systems. It could be argued that potential sources of underground water are endangered whenever they are degraded. In the case of a potential source of underground water which would meet primary drinking water regulations without treatment, degradation of that water may make treatment necessary. In the case of a potential source of underground water which will require treatment if it is used in the future, degradation may make further treatment necessary or may make the water unsuitable for use as drinking water.

The problem of what constitutes "endangerment" is further complicated by

the fact that it is expected that several contaminants not covered by the national interim primary drinking water regulations will be covered within a few years by the revised regulations. It can also be anticipated that new contaminants will be added to the revised regulations from time to time thereafter. How can underground injection control programs protect underground water sources from "endangerment" by contamination with materials which are not now prohibited in any concentration in drinking water but which may be limited by future maximum contaminant levels?

Finally, there is the statutory mandate to protect underground water sources from any contamination which "may otherwise adversely affect the health of persons." The legislative history of the SDWA suggests that this language means, at the least, that contamination by underground injection which causes ground water to be unpalatable is prohibited (Report 93-1185), at 32). The justification for such a prohibition is that it makes little difference that water can meet applicable primary regulations if for aesthetic or other reasons it is undrinkable. Clearly there can be other types of contamination which "may otherwise adversely affect the health of persons." For example, water with offensive taste, odor, or color may force the use of alternative water sources of poorer quality. Also, even if a specific dangerous pesticide or other toxic chemical is not covered by the primary regulations because it is not usually found in drinking water supplies, the contamination of an underground drinking water source by that chemical could adversely affect the health of persons who obtain the drinking water from that source.

Despite the difficulty of defining endangerment of drinking water as that term is used in the statute, the task must be undertaken in these regulations. For although every effort will be made to permit consideration of local geological conditions, local laws and local procedures, the basic health standards to be applied in underground injection control programs should be uniform across the country. It was the intent of Congress to accommodate local differences within the framework of a national policy for the protection of the health of the Nation's citizens.

Endangerment of drinking water sources is defined in proposed § 146.2(x) as follows:

Underground injection "endangers underground drinking water sources" if (1) such injection may make it necessary for a public water system using an underground drinking water source to increase treatment of the water, or (2) if such injection might make it necessary for a public water system which uses the source in the future to use more extensive treatment of the water than would otherwise have been necessary, or (3) if such injection may otherwise adversely affect the health of persons such as by adding a substance that would make water from the source unfit for human consumption.

It is expected that the application of the definition of endangerment will be different in the case of existing underground injection than in the case of new underground injection. An applicant for a permit for underground injection will be expected to demonstrate to the satis-

faction of the State that the injection will not endanger underground drinking water sources. However, in the case of an existing injection, the applicant normally will be able to show, based on the history of the operation, that continued operation will not require additional treatment of ground water for drinking water use and will not otherwise adversely affect the health of persons such as by making the water unfit for use as drinking water. New underground injections, or a substantial change in an existing underground injection, will be expected to bear a heavier burden of proof.

Comments on the definition of the endangerment of drinking water sources and how that definition might be applied in the regulations are welcomed.

B. COMPARISON OF SUBPARTS C AND D

1. Standards for Existing and New Injection Wells. Existing wells under both Subparts C (waste disposal wells and engineering wells) and D (oil or natural gas production) could be regulated by rule for a period of up to five years after approval of the State program so long as such wells do not endanger underground drinking water sources. Proposed § 146.10(a) would prohibit new underground injection under both subparts without a permit. Section 1421(b)(1)(A) of the Act authorizes EPA to permit a State to regulate underground injection by rule or permit, and the legislative history of this provision states:

In order to implement these controls to protect drinking sources with minimum administrative redtape, the Committee decided to allow EPA discretion to utilize a permit system, rulemaking, or a combination of the two to control underground injection. (Report 93-1185, at 30)

Accordingly, EPA believes that it is prudent to allow States to phase-in permit procedures for existing wells under Subparts C and D so long as underground sources of drinking water are protected by appropriate rules. Consistent with this effort to minimize redtape, proposed § 146.41(a)(1) provides that a State Director has discretion to require appropriate information in permit applications for existing underground injections under Subpart D. By comparison, the information set out in proposed § 146.47 is required in all permit applications for new injection sites under Subpart D. Similarly, the information set out in proposed § 146.24 under Subpart C is required in permit application for both new and existing operations. The reason behind this distinction is the large number of existing injection wells related to oil or gas production and the vast amount of data already on file in the States. By granting the Director discretion with respect to information requirements for these wells, EPA anticipates that a State will be able to focus its resources on critical existing injection sites without becoming enveloped in an unduly burdensome permit program for existing wells.

2. Permit System Subparts C and D. As noted above, permits would be required for all underground injections which commence operation in a

State after approval of the State program ("New underground injections"). Permits would be required for all underground injection operations in operation prior to approval of the State program within five years of approval. Section 1421(b) of the Act does not specify any type of hearing as a prerequisite to the issuance of a permit, but the regulations provide for an opportunity for informal public hearing prior to the issuance of permits under Subparts C (§146.28) and D (§146.45). Proposed §146.4 provides the Director with discretion in determining necessary requirements for the renewal of permits after five years. Public notice of the renewal of a permit would be required by proposed §146.5. It is anticipated that State administrative procedures will provide for judicial review of permit proceedings.

3. Temporary Permits. Section 1421(c) (1) of the Act allows the Administrator to authorize a State to issue temporary permits for existing underground injection operations, effective until December of 1978, when the State is unable to process all permits within the time available. The authority can be given to a State only under the conditions spelled out in section 1421(c) (1), and only under an application for the authority from the Governor of the State. Under the proposed regulations, section 1421(c) (1) authority would not be necessary because the States would be allowed to regulate wells covered by Subparts C and D by rule rather than by permit for up to five years and to regulate drainage wells by rule indefinitely.

Section 1421(c) (2) of the Act permits the Administrator to authorize a State, again only under an application from the Governor of the State, to issue temporary permits amounting to variances from the prohibition of endangerment of underground drinking water sources. As in the case of the section 1421(c) (1) temporary permits, these permits cannot be effective later than December of 1978. Furthermore, a temporary permit under section 1421(c) (2) cannot be issued by a State until the State can find, based on the record of a hearing, that each of the following requirements are met:

(A) That technology (or other means) to permit safe injection of the fluid in accordance with the applicable underground injection control program is not generally available (taking costs into consideration);

(B) That injection of the fluid would be less harmful to health than the use of other available means of disposing of waste or producing the desired product; and

(C) That available technology or other means have been employed (and will be employed) to reduce the volume and toxicity of the fluid and to minimize the potential adverse effect of the injection on the public health.

C. SUBPART E

Proposed Subpart E allows a State program to exercise great flexibility in designing a program for the control of drainage wells. A State may regulate these wells by either rule or permit, or a combination thereof. While seeking to prevent drainage wells from endanger-

ing underground water sources, EPA recognizes that the number and diverse characteristics of drainage wells make it extremely difficult to establish specific requirements under Subpart E. Accordingly, EPA has allowed State programs maximum flexibility to deal with drainage wells on a case by case basis, if necessary. As such, EPA intends to monitor State programs under Subpart E and carefully analyze the efficacy of this approach.

D. REMEDIAL ACTION UNDER SUBPARTS C, D AND E

Underground injection operations regulated under Subpart C, D, or E that are found to endanger underground drinking water sources are required to discontinue operations until remedial action is taken unless the Director determines that it is unreasonable and impracticable to discontinue operations while taking remedial action. If the Director permits an endangering operation to continue operation while taking remedial action, the Director must prescribe a compliance schedule which shall require remedial action to be taken as soon as practicable but in no case later than one year following the determination of endangerment. It is expected that State Director will require cessation of injection in cases where an imminent health problem may result from such an injection.

SPECIFIC PROVISIONS OF THE REGULATIONS

A. REVIEW OF COMPLETION AND PLUGGING REPORTS

Proposed §146.22(f) requires that "all well completion and plugging reports" for wells penetrating the proposed injection zone within a two mile radius of the proposed well injection be reviewed to insure that all wells that, in the judgment of the Director, present a potential threat to underground drinking water sources are properly completed or plugged. In §146.42(a) (6) dealing with oil and gas production this review is also required except that the radius is reduced to one-half mile. These requirements are intended to prevent the contamination of underground drinking water sources by formation fluids or injected fluids migrating up improperly completed or plugged wells into fresh water formations.

EPA feels that the same minimum regulations should apply to both waste disposal wells and engineering wells because they share common construction, engineering, and operational characteristics. Most States have defined policies for waste disposal wells but few policies exist on the engineering wells. Fourteen States entirely ban the use of waste disposal wells. Twelve States have specific regulations applying to waste disposal wells. The requirements relating to radius of review vary, but a two mile or greater radius is most common. Texas, which now regulates over 40 percent of all such wells, requires a two and one-half mile radius of review. Twenty other States have policies requiring a careful

case by case review of waste disposal wells. Therefore, on the basis of the Texas requirement and the fourteen States which ban waste disposal wells, EPA does not feel that a minimum radius of review below two miles would be appropriate. It is important to note that these regulations neither require those States which ban waste disposal wells to permit them in the future nor require a State such as Texas to adopt less stringent requirements. To the contrary, EPA encourages States to adopt more stringent requirements, if necessary, to prevent the endangerment of underground water sources.

State regulations demonstrate flexibility with respect to injection wells related to oil and gas production. Thirty of the thirty-one oil producing States require a plat denoting ownership and location of all wells including oil, gas, drilling and dry holes. Seventeen of the thirty-one States have specified that all wells within a one-half mile radius of the proposed injection wells should be indicated on a map or plat and that the injected fluid will not cause damage to oil, gas, fresh water or other natural resources. Further, it should be noted that the plugging or completion requirement applies only to those wells penetrating the injection zone which pose a potential danger to underground drinking water sources. It is incumbent on the injector to demonstrate that no hazard exists.

B. SURFACE CASING REQUIREMENTS

Proposed §§146.22(a) and 146.42(a) (1) require that "all underground drinking water sources of 3,000 mg/l total dissolved solids or less (be) protected by surface casing cemented to the surface."

The House Report accompanying the SDWA recommended that all ground water up to 10,000 mg/l TDS be protected as potential drinking water sources. Discussion with major oil producing States indicated that existing practice requires protecting ground water containing up to 3,000 mg/l TDS with surface casing as potential drinking water sources. In light of these existing provisions, the 3,000 mg/l limit has been established as a minimum standard. Of course, where underground injection would endanger a present or potential source of drinking water containing up to 10,000 mg/l TDS, EPA expects States to protect such a source.

It is recognized, however, that in oil producing States there are specific areas where alternate methods of protection have been utilized effectively in the past to protect ground water and can be used to do so in the future. Therefore, the Director is given discretion under §146.42 (b) to permit the continued use of this practice within specified areas of the State provided a public hearing is held. Compelling evidence must be adduced at such a hearing to demonstrate that the continued use of the practice will not endanger underground sources of drinking water. The alternative chosen will be applicable to all wells within the specific area.

C. TUBING AND PACKER

Proposed §§ 146.22(c) and 146.42(a) (2) require that "injection is maintained through tubing with a suitable packer set immediately above the injection zone." Most State regulations and those knowledgeable in the field of underground injection recommend that tubing and packer or fluid seal be used to isolate the injection zone from potential drinking water sources which may be endangered as a result of the injection of fluids.

It is recognized, however, that there are some areas where alternative methods of protection have been used and can continue to be used effectively to protect ground water. For this reason, the Director is given the discretion to permit the continued use of this practice under § 146.42(b) provided a public hearing is held. Compelling evidence must be adduced at such a hearing to demonstrate that the continued use of the practice will not endanger underground sources of drinking water. The alternative chosen will be applicable to all wells within the specific area. The Director may also approve alternative methods under § 146.22(c) where they are demonstrated to be equally effective.

D. ANNULAR INJECTION

Section 146.2(z) defines "annular injection" as any injection between strings of casing, between tubing and casing, between strings of tubing and between casing and hole. The following sections deal with the differing types of protection necessary to protect drinking water sources from the three common types of annular injection.

Section 146.42(a) (7) prohibits annular injection between the casing and the hole. With this type of annular injection, there is no protection for underground sources of drinking water.

Section 146.42(a) (8) prohibits annular injection between strings of casing and between tubing and casing, except that the Director may approve such injection provided: (1) there is an annulus between the outer string of casing receiving the injection, and the surface casing which can and will be monitored for leaks; (2) that the surface casing is protected by cement to the surface; and (3) that the injector demonstrates to the satisfaction of the Director that the injection will not endanger underground sources of drinking water.

Section 146.42(a) (9) prohibits annular injection between the surface casing and the next innermost casing or between the surface casing and the tubing, or injection through the surface casing only; except that the Director may approve such injection where: (1) the injection was in operation prior to approval of the proposed State program, and; (2) the injector demonstrates to the satisfaction of the Director that, based on previous history and presentation of compelling evidence collected through fluid injection profile surveys or monitoring wells that the injection has not endangered underground sources of drinking water, nor will

its continued use endanger underground sources of drinking water. Comments are solicited on the adequacy of these requirements in protecting underground sources of drinking water and on the impact of these requirements on existing wells.

E. MONITORING WELL

Section 146.42(a) (9) permits presentation of evidence gathered from monitoring wells in support of a demonstration of non-endangerment from an annular injection. These monitoring wells may be drilled specifically for this purpose or they may be producing water wells currently in place providing they draw water from the base of fresh water within the calculated zone of influence of the injection well.

F. SUPPLEMENTAL DATA ACQUISITION

Section 146.47(b) contains a list of additional data which is desirable to have in evaluating an application for well injection. It should be noted, however, that it is not necessary to collect this data in every case. This data should be collected only where necessary to make the necessary determinations.

G. PRESENTATION OF COMPELLING EVIDENCE

Sections 146.22(e), 146.42(a) (9), 146.42(e) (1) and 146.42(e) (2) require the presentation of "compelling evidence." "Compelling evidence" means the types and quantity of data necessary to provide a base such that reasonably qualified people would draw the same conclusion. In § 146.42 (e) (1) and (e) (2) "written" compelling evidence is required. This may take the form necessary to satisfy the Director. However, in States where a formal public hearing, including the use of court stenographers and cross examination is required, this procedure may be utilized alone or in support of other requirements by the Director.

H. CATEGORIZATION ANOMALIES

There are several special types of wells such as certain recharge wells and mining wells, where current technology mandates utilization of annular injection, and multiple use wells such as those used for water flood and subsidence control which may not readily fit into the current categorization scheme. Comment is solicited on the extent and nature of these wells and on the necessity of developing different minimum requirements than those currently contained in the regulations.

I. SUMMARY OF SOLICITED COMMENTS

Comments are solicited on specific parts of the regulations. These are summarized below:

1. Definition of "underground drinking water source";
2. Definition of "well injection";
3. Definition of "endangers underground drinking water sources";
4. Requiring data to be kept by States in a form admissible as evidence in enforcement proceeding;
5. Adequacy of time for conducting inventory and analyses of surface impoundments;

6. Combination rule-permit programmatic staging system for existing injection wells;

7. Handling of confidential information;

8. Adequacy of requirements in preventing endangerment and impact of these requirements on existing annular injection wells; and

9. Alternative methods of determining non-endangerment from wells penetrating injection horizon.

COMMENTS

Interested persons may participate in this rulemaking process by submitting written comments in triplicate to the Office of Water Supply (WH-550), Environmental Protection Agency, Washington, D.C. 20460 Attention: Comment Clerk, State Underground Injection Control Program Regulations.

Comments on all aspects of the proposed regulations are solicited. In addition to considering public comments, the Agency will hold public hearings to receive comments and statements on the proposed regulations. The hearing room locations, dates and times should be confirmed by interested parties in advance by telephone.

October 6, 1976: EPA, Region VIII, 900 Lincoln Tower Building, 1860 Lincoln Street, Denver, Colorado 80202, Telephone: (303) 837-2731.

October 13, 1976: EPA, Region VI, First International Building, 1201 Elm Street, Dallas, Texas 75270, Telephone: (214) 749-1962.

September 29, 1976: EPA, headquarters, Waterside Mall, 401 M Street SW., Washington, D.C. 20460, Telephone: (202) 426-3934.

All comments received on or before November 15, 1976 will be considered. A copy of all public comments will be available for inspection and copying from the EPA Freedom of Information Center. As provided in 40 CFR Part 2, a reasonable fee may be charged for copying services.

It is our judgment that these proposed regulations will not have a significant impact on inflation as specified in the Agency's Guidelines on Inflation Impact Statement, as specified in the Agency's Guidelines. Hence, these regulations are not considered major regulatory actions so that they do not require preparation of an Inflation Impact Statement as set forth in Executive Order 11821. However, an economic evaluation has been prepared.

It is hereby announced that a draft Environmental Impact Statement has been prepared on these proposed regulations. Copies of the statement may be obtained from the Office of Water Supply (WH-550), Environmental Protection Agency, Washington, D.C. 20460, Attention: UIC-EIS.

The Council on Environmental Quality will publish in the FEDERAL REGISTER on the second Friday following proposal of these regulations the duration of the comment period. All comments received on or before the date specified by CEQ will be considered.

Comments should be submitted in triplicate to the Office of Water Supply (WH-550), Environmental Protection Agency, Washington, D.C. 20460, Attention: Comment Clerk Environmental Impact Statement-UIC.

Dated: August 13, 1976.

RUSSELL E. TRAIN,
Administrator.

Subpart A General

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- 146.20 Underground injection to which subpart applies.
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146.43 Public notice of proposed issuance or denial of UIC permits for existing and new underground injections.
146.44 Notice to other Government agencies.
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146.49 Monitoring and record-keeping.
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Subpart E Requirements Applicable to All Drainage Wells

- 146.70 Underground injections to which subpart applies.
146.71 Regulation by rule or permit.
146.72 Regulation by permit.
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Subpart A—General

§ 146.1 Scope and purpose.

(a) Part C of the Safe Drinking Water Act, Pub. L. 93-523, added to the Public Health Service Act ("the Act") provisions for the protection of present and potential underground drinking water sources from contamination by underground injection of contaminants. Public Health Service Act, sections 1421-1424, 42 U.S.C. 300-h through 300-h-3.

(b) Section 1422 of the Act provides that the Administrator shall list in the FEDERAL REGISTER each State for which in his judgment a State underground injection control program may be necessary to assure that underground injection will not endanger drinking water sources. Within 270 days after a State is listed, it must submit to the Administrator a State program adequate to protect underground sources of drinking water. If the State program is not submitted or is not approved by the Administrator, an underground injection control program for the State must be prescribed by the Administrator.

(c) Under sections 1421, 1422 and 1450 of the Act, this part sets forth procedural and substantive requirements which must be met by State programs to obtain the Administrator's approval. Any State program approved by the Administrator will be subject to the requirements of this part. A State with an approved program in effect shall have primary enforcement responsibility for all underground injection activities in the State, except as noted in paragraph (d) of this section.

(d) To qualify for primary enforcement responsibility, a State's program for enforcement of underground injection control regulations must apply to all underground injection practices in the State required to be regulated by this Part, except for:

(1) Underground injection practices on Indian land where the State does not have the necessary jurisdiction or its jurisdiction is in question; or

(2) An underground injection practice operated by or for a Federal agency where the Administrator has waived compliance with all or part of an applicable underground injection control program under section 1447(b) of the Act.

(e) Underground injection to be regulated includes underground injection by municipal and industrial waste disposal wells, storage wells, subsidence control wells, mining wells, geothermal wells, barrier wells, recharge wells; underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production

and underground injection for the secondary or tertiary recovery of oil or natural gas; and underground injection by drainage wells.

§ 146.2 Definitions.

As used in this part, and except as otherwise specifically provided:

(a) "Act" means the Public Health Service Act.

(b) "Agency" means the United States Environmental Protection Agency.

(c) "Administrator" means the Administrator of the Agency or his authorized representative.

(d) "Regional Administrator" means a Regional Administrator of the Agency.

(e) "Director" means the chief administrative officer of a State groundwater pollution control agency. In the event responsibility for groundwater pollution control and enforcement is divided among two or more State agencies, the term "Director" means the State administrative officer authorized to take the action to which reference is made.

(f) "FWPCA" means the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1314, et seq.

(g) Except as provided in § 146.11, "Underground drinking water source" means (1) an aquifer which currently supplies a public water system, or (2) an aquifer which contains water having less than 10,000 mg/l total dissolved solids.

(NOTE.—Comment is solicited on the adequacy of this definition.)

(h) "Contaminant" means any physical, chemical, biological, or radiological substance or matter in water.

(i) "Public water system" means a system for the provision to the public of piped water for human consumption, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals daily at least 60 days out of the year. Such term includes (1) any collection, treatment, storage, and distribution facilities under control of the operator of such system and used primarily in connection with such system, and (2) any collection or pretreatment storage facilities not under such control which are used primarily in connection with such system.

(j) "State Underground Injection Control Program" (State UIC Program) means a State program for the regulation of the practice of underground injection to protect underground drinking water sources and meeting the requirements of sections 1421 and 1422(b) (1)(A)(ii) of the Act and regulations promulgated under those provisions of the Act.

(k) "Underground Injection Control permit application" (UIC permit application) means the State application form including subsequent additions, revisions, or modifications duly promulgated by the Director for application for a UIC permit.

(l) "Underground Injection Control reporting forms" (UIC reporting forms) means any State reporting forms, including subsequent additions, revisions,

or modifications duly promulgated by the Director for reporting data and information pursuant to monitoring and other conditions of UIC permits.

(m) "Underground Injection Control permit" (UIC permit) means any permit or equivalent document issued by the Director, setting forth the terms under which the applicant may inject fluids.

(n) "Aquifer" means a formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield or be capable of yielding significant quantities of water to wells or springs.

(o) "Total dissolved solids" means the entire quantity of inorganic and organic materials dissolved in water.

(p) "Underground injection" means subsurface emplacement of a fluid, or fluids by well injection.

(q) "Fluid" means material which flows or moves, whether semi-solid, liquid, sludge, or any other form or state.

(r) "Well injection" means subsurface emplacement through a bored, drilled, or driven well, or through a dug well where the depth is greater than the largest surface dimension, whenever a principal function of the well is the subsurface emplacement of fluids.

(NOTE.—Comment is solicited on the adequacy of this definition.)

(s) "Surface Impoundment" means any dug well which has a depth less than the greatest surface dimension and is used for collection, storage, treatment, or disposal of fluids.

(t) "Existing underground injection" means underground injection in operation in a State before the approval of the proposed State program pursuant to section 1422(b) of the Act.

(u) "New underground injection" means underground injection which starts operation in a State after approval of the proposed State program under section 1422(b) of the Act.

(v) "Person" means an individual, corporation, partnership, association, State, municipality, or Federal agency other than the Agency.

(w) "Municipality" means a city, town, or other public body created by or under State law, or an Indian tribal organization authorized by law.

(x) Underground injection "endangers underground drinking water sources" if (1) such injection may make it necessary for a public water system using an underground drinking water source to increase treatment of the water, or (2) if such injection might make it necessary for a public water system which uses the source in the future to use more extensive treatment of the water than would otherwise have been necessary, or (3) if such injection may otherwise adversely affect the health of persons such as by adding a substance that would make water from the source unfit for human consumption.

(NOTE.—Comment is solicited on the adequacy of this definition.)

(y) "Federal agency" means any department, agency, or instrumentality of the United States.

(z) "Annular injection" means any injection between strings of casing, between tubing and casing, between strings of tubing and between casing and hole.

§ 146.3 Duration of permits.

No UIC permit may be issued for a term greater than five years.

§ 146.4 Renewal of UIC permits.

Upon a request by the permittee, the Director may renew a permit, without requiring a formal reapplication by the permittee, after a determination by the Director that the continued operation of the underground injection will not endanger underground sources of drinking water. If the Director determines that the continued operation of the facility may endanger underground sources of drinking water the Director may require the permittee to submit information to demonstrate that the continued operation of the facility will not endanger underground sources of drinking water. If the Director finds that the permittee has failed to demonstrate the continued operation will not endanger underground sources of drinking water, the Director shall refuse to reissue the permit. The Director's decision shall be set forth in writing, and a copy furnished to the applicant.

§ 146.5 Public notice of renewal of UIC permits.

The director shall give public notice of the intent to renew a UIC permit or group of permits under either §§ 146.26 (a), 146.43 (a) and 146.72 (b).

Subpart E—State Underground Injection Control Programs

§ 146.10 Requirements for approval of a State Underground Injection Control Program.

The Administrator will approve a proposed State Underground Injection Control Program under section 1422 of the Act if the State program:

(a) Prohibits, effective December 16, 1977, or as of the time of the Administrator's approval, any underground injection covered by Subparts C or D which is not authorized by a permit issued by the State; except that if underground injection in operation prior to the approval of the State program under section 1422(b) of the Act, the State program may authorize continued operation by rule for a period of up to five years from the date of designation;

(b) Prohibits, effective December 16, 1977, or as of the time of the Administrator's approval, any underground injection covered by Subpart E which is not authorized by a rule or permit issued by the State;

(c) Complies with Subparts C, D and E, which set forth requirements for the various categories of underground injection;

(d) Applies to underground injection by any person within the boundaries of the State, including any Federal agency, except for:

(1) Underground injection practices on Indian land which the State does not

have the necessary jurisdiction or its jurisdiction is in question; or

(2) An underground injection practice operated by or for a Federal agency where the Administrator has waived compliance with all or part of an applicable underground injection control program under section 1447(b) of the Act.

(e) Includes statutory or regulatory enforcement authority adequate to compel compliance with State requirements which seek to prevent the endangerment of underground drinking water sources by underground injection, such authority to include:

(1) Authority to sue in courts of competent jurisdiction to enjoin any threatened, or continuing violation of the State Underground Injection Control regulations;

(2) Right of entry and inspection of underground injection facilities, including the right to monitor or take samples, whether or not the State has evidence that the facility is in violation of an applicable legal requirement;

(3) Authority to require operators of underground injection facilities to keep appropriate records and make appropriate reports to the State; and

(4) Authority to assess civil or criminal penalties for violation of the State's Underground Injection Control regulations including the authority to assess daily penalties or multiple penalties when a violation continues;

(f) Insures that any information on file with the State and pertinent to UIC applications and permits shall be available to the public for inspection and copying subject to appropriate protection of trade secrets;

(g) Includes inspection and surveillance procedures which with reasonable assurance will determine, independent of information supplied by applicants and permittees, compliance or noncompliance with applicable standards and limitations, UIC permit filing requirements, and issued UIC permits or terms or conditions thereof. Such surveillance and inspection support procedures shall include the following:

(1) A supporting survey program with sufficient capability to make systematic surveys of operations subject to the Director's authority in order to identify and locate all operations subject to UIC permit filing requirements;

(2) A supporting inspection program for the periodic inspection of underground injection operations, systems, or facilities. Such inspection shall determine compliance or noncompliance with the terms, conditions, limitations and schedules of compliance in UIC permits; and

(h) Has been adopted after reasonable notice and public hearings.

§ 146.11 Aquifers protected by a State program.

(a) Notwithstanding § 146.2(g) which defines "underground drinking water sources" to encompass aquifers which do not currently supply a public water system but which contain water having less than 10,000 mg/l. total dissolved solids—a State program which does not under-

take to protect one or more such aquifers or portions thereof may meet the requirements for primary enforcement responsibility if the State can demonstrate to EPA that the aquifer or portion thereof is not an underground drinking water source because the aquifer is either oil-producing; is too contaminated for use as an underground drinking water source; or is in a location which makes future use of the aquifer as an underground drinking water source impracticable, and that the injection into such aquifer would not endanger underground drinking water sources in another part of the aquifer or in another aquifer.

(b) The State program may designate specific geographic areas which do not contain underground sources of drinking water as defined in § 146.2(g), in which underground injection is not subject to these regulations. The State must clearly demonstrate to EPA that within that specified area no underground drinking water sources exist, and further that underground injection in such a geographic area would not endanger underground drinking water sources outside that area.

(c) A complete record of all evidence as well as all analyses of such evidence related to designations under (a) and (b) above shall be submitted to the Administrator upon submission of the State program under section 1422(b) of the Act. All injection wells located in the designated area shall be identified as a part of the submission to the Administrator. Such designations are subject to the requirements of §§ 146.10(h) and 146.14(a). If an area is to be designated after approval of the State program the procedure contained in this paragraph must be followed.

§ 146.12 Request for approval of a State Underground Injection Control Program.

A State may apply to the Administrator for approval of its Underground Injection Control Program under § 146.10. The application shall be as concise as possible, shall describe and document the State's compliance with the requirements set forth in § 146.10, and shall include the following information:

(a) The text of the State's statutory authority and regulations pertaining to the State underground injection control program; and

(b) A brief description, accompanied by appropriate documentation, of the State's procedures for the enforcement of its underground injection control program, including State inspection, monitoring, recordkeeping and reporting requirements.

§ 146.13 Action on request for approval of a state program.

(a) (1) Upon receipt of a request for approval of a State program submitted under § 146.12, the Administrator shall publish notice of the request in the FEDERAL REGISTER and in a newspaper or newspapers of general circulation in the State involved, with a brief summary of the State program, and shall invite comments on the request.

(2) Within 90 days after receipt of the State's completed application, the Administrator shall either approve, disapprove, or approve in part and disapprove in part, the State program. The Administrator's action shall take effect in accordance with § 146.14.

(b) (1) If the Administrator approves the State program, the State shall have primary enforcement responsibility for underground injection control in the State until such time as the approval is terminated under this paragraph (b).

(2) The Administrator shall periodically review, with respect to each State determined to have primary enforcement responsibility, the compliance of the State with the requirements set forth in § 146.10.

(3) When the Administrator's periodic review, or other information available to him, indicates that a State no longer meets the requirements set forth in § 146.10, he shall notify the State in writing of that fact and shall summarize in his notice the information available to him which indicates that the State no longer meets such requirements.

(4) The State notified under subparagraph (3) of this paragraph may, within 30 days of receiving the Administrator's notice, submit to the Administrator evidence demonstrating that the State continues to meet the requirements for primary enforcement responsibility.

(5) After reviewing the submission of the State, if any, made under subparagraph (4) the Administrator shall either determine that the State no longer meets the requirements of § 146.10 or that the State continues to meet those requirements, and shall notify the State of his determination. Any determination that the State no longer meets the requirements of § 146.10 shall not become effective except as provided in § 146.14.

§ 146.14 Public hearing.

(a) Before any determination as to the transfer of authority to a State under § 146.13(a) becomes effective, or any determination pursuant to § 146.13(b) that a State program no longer meets the requirements of § 142.10 becomes effective, the Administrator shall provide an opportunity for public hearing on his determination under section 1422(b)(3) of the Act.

(b) The Administrator shall publish notice of any determination specified in paragraph (a) of this section in the FEDERAL REGISTER and in a newspaper or newspapers of general circulation in the State involved, within 15 days after making such determination, with a statement of his reasons for the determination. The notice shall inform interested persons that they may request a public hearing on the Administrator's determination. Such notice shall also indicate one or more locations in the State where information submitted by the State under § 146.11 is available for inspection by the general public. A public hearing may be requested by any interested person other than a Federal agency.

(c) Requests for hearing under paragraph (b) of this section shall be submitted to the Administrator within 30

days after publication of notice of opportunity for hearing in the FEDERAL REGISTER. Such requests shall include the following information:

(1) The name, address and telephone number of the individual, organization or other entity requesting a hearing;

(2) A brief statement of the requesting person's interest in the Administrator's determination and of information that the person making the request intends to submit at such hearing; and

(3) The signature of the individual making the request; or, if the request is made on behalf of an organization or other entity, the signature of a responsible official of the organization or other entity.

(d) If an appropriate request for hearing is submitted in accordance with paragraph (c) of this section, the Administrator shall give notice in the FEDERAL REGISTER and in a newspaper or newspapers of general circulation in the State involved, of any hearing to be held according to a request submitted by an interested person or on his own motion. Notice of the hearing shall also be sent to the person requesting a hearing, if any, and to the State involved. Notice of the hearing shall include a statement of the purpose of the hearing, information regarding the time and location for the hearing and the address and telephone number of an office at which interested persons may obtain further information concerning the hearing. At least one hearing location specified in the public notice shall be within the involved State. Notice of hearing shall be given not less than 30 days prior to the time scheduled for the hearing.

(e) Hearings convened under paragraph (d) of this section shall be conducted before a hearing officer to be designated by the Administrator. The hearing shall be conducted by the hearing officer in an informal, orderly and expeditious manner. The hearing officer shall call witnesses, receive oral and written testimony and take such other action as may be necessary to assure the efficient conduct of the hearing. Following the conclusion of the hearing, the hearing officer shall forward the record of the hearing to the Administrator.

(f) After reviewing the record of the hearing and other relevant information, the Administrator shall issue an order affirming the determination referred to in paragraph (a) of this section or rescinding such determination. If the determination is affirmed, it shall become effective as of the date of the Administrator's order.

(g) If no timely requests for hearing is received and the Administrator does not determine to hold a hearing on his own motion, the Administrator's determination shall become effective 45 days after notice is issued under paragraph (b) of this section.

(h) If a determination of the Administrator that a State no longer meets the requirements of § 146.10 becomes effective, the State may later apply for a determination that it meets such requirements by submitting to the Admini-

istrator information demonstrating that it has remedied the deficiencies found by the Administrator without adversely affecting other aspects of its program required by § 146.10.

(f) Within 270 days after any amendment of a regulation, under section 1421, revising or adding any requirement, each State shall submit a notice to the Administrator containing a showing satisfactory to him that the State program meets the revised added requirement.

§ 146.15 Records kept by States.

(a) Each State which has primary enforcement responsibility under section 1421(b)(1)(c) of the Act shall maintain the following information with respect to each underground injection for which a permit is in effect or for which the Director has received evidence of a violation of applicable requirements:

(1) Reports of any monitoring required by the permit or other surveillance conducted by the Director;

(2) Copies of permits in effect and the applications for those permits; and

(3) Records of any enforcement actions or evidence of violation of applicable requirements.

(b) Records required to be kept under paragraph (a) must be in a form admissible as evidence in State enforcement proceedings.

(NOTE.—Comment is solicited on the feasibility of requiring data to be kept in this form.)

(c) Each State which has enforcement authority for the injection regulated under Subpart D of these regulations shall maintain complete records of all approvals granted under § 146.42(a)(8) and (9) and § 146.42(c).

§ 146.16 Reports by States.

Each State which has primary enforcement responsibility shall submit to the Administrator the following information:

(a) A complete inventory of all underground injections subject to regulation under Subpart C, D, and E of this Part within one year after approval of the program; and

(b) An inventory of existing surface impoundments, and an assessment of the extent to which they function to emplace fluids underground and an evaluation of the hazard they pose to underground drinking water supplies, within eighteen months after approval of the program, and

(NOTE.—Comment is solicited on the adequacy of the time for conducting this inventory and subsequent analysis in defining the problem of underground injection through dug wells including surface impoundments not currently covered by this Regulation.)

(c) An annual report to be submitted by April 1 of every year, consisting of:

(1) A summary of the number of violations of State underground injection control statutes and regulations and of enforcement actions taken by the State;

(2) An updated list of new and abandoned underground injection operations in the State;

(3) A listing of specific permits issued for underground injections in areas designated under §§ 146.11 and 146.42(b).

(4) A listing of specific permits containing approvals granted under §§ 146.42(a)(8), 146.42(a)(9) and 146.42(c).

(5) Information on any proposed material change in the State program, before adoption of the change.

Subpart C—Requirements Applicable to Waste Disposal Wells and Engineering Wells

§ 146.20 Underground injections to which subpart applies.

This subpart sets forth requirements for State programs of underground injection by industrial and municipal waste disposal wells, subsidence control wells, barrier wells, recharge wells, mining wells, storage wells and geothermal wells.

§ 146.21 Review of existing underground injections.

(a) Underground injections which were in operation under approval by the Director under an existing State program before the approval of the proposed State program under section 1422(b) of the Act may, for a period of up to five years after approval, be regulated by rule provided such underground injections will not endanger underground drinking water sources.

(1) The Director shall require applications to be filed under § 146.24 for each existing underground injection which is to continue in operation.

(2) The Director shall systematically review such underground injections to determine that they do not endanger underground drinking water sources. The method of review to be used must be indicated in the program submission to EPA along with a time schedule to assure that all existing underground injections will be reviewed within five years.

(3) Underground injection operations that are found to endanger underground drinking water sources shall discontinue operation pending remedial action unless the Director determines that it is unreasonable or impracticable to discontinue operating pending remedial action. If the Director permits an endangering operation to continue pending remedial action the Director shall prescribe a compliance schedule which shall require remedial action to be taken as soon as practicable but not later than one year following the determination of endangerment.

(b) Pending review by the Director, underground injections must comply at a minimum with State rules in effect on date of proposal of the program by the State.

(NOTE.—Comment is solicited on the practicality and impact of this regulatory approach.)

§ 146.22 Requirements for existing and new underground injections.

The Director shall review data on existing underground injections and on proposed new underground injections to assure that:

(a) All underground drinking water sources of 3,000 mg/l total dissolved

solids or less are protected by casing cemented to the surface;

(b) The long string is cemented with sufficient cement to assure no migration of injected fluid above or below the injection zone;

(c) Injection is maintained through tubing with a suitable packer set immediately above the injection zone; except that the Director may approve an alternative method of protection where compelling evidence has been presented demonstrating that the alternative method will prevent endangerment of underground drinking water sources. The Director must also offer the opportunity for informal public hearing.

(d) There are no leaks in the system;

(e) Surface injection pressure is limited to preclude the possibility of fracturing the confining strata;

(f) All well completion and plugging reports for wells of record penetrating the proposed injection zone within a two mile radius of the proposed well injection should be thoroughly reviewed to insure that all wells are properly completed and/or plugged that in the judgment of the Director present a potential threat to underground drinking water sources; and

(g) Annular injection is not practiced.

§ 146.23 General permit procedures.

State procedures for permits subject to this subpart shall insure that every applicant for a permit complies with filing requirements to include the following:

(a) The applicant must submit a complete UIC permit application on forms prescribed by the Director, including data required by § 146.24 except that if the Director determines that the data required is on file with the regulatory agency regulating the injection under consideration, the Director may consider the application complete without resubmission of that specific data.

(b) In the case of new underground injections, a complete UIC permit application must be filed far enough in advance of the date on which it is desired to start the injection to allow adequate consideration of the application, and in sufficient time before starting the injection to insure compliance with any applicable requirement under section 208(b)(2)(K) of the FWPCA, and any other applicable regulations; and

(c) Procedures must be established which (1) enable the Director to require submission of additional information after an application has been filed, and (2) insure that, if any UIC permit application is incomplete or otherwise deficient, processing of the application shall not be completed until such time as the applicant has supplied the missing information or otherwise corrected the deficiency.

§ 146.24 Application for UIC permit.

Each application for a UIC permit covered by this subpart shall include the following information:

(a) Ownership and Location Data. The application shall identify the owner and operator of the proposed under-

ground injection facility, and the location of the facility.

(b) An accurate map showing (i) location and surface elevation of the injection well, (ii) location of all facilities, (iii) property boundaries, and (iv) surface mineral ownership.

(c) An accurate map showing the location of: water wells; surface bodies of water; oil, gas, exploratory or test wells (with depths of penetration); other injection wells; mines (surface and subsurface) and quarries; and other pertinent surface features including residences, roads, bedrock outcrops, and faults and fractures within a two mile radius of the injection operation.

(d) A tabulation of all wells requested under (c) penetrating the proposed injection zone, showing operator; lease or owner; well number; surface casing size, weight, depth and cementing data for surface, intermediate and long string casings; and plugging data.

(e) Maps and cross sections indicating the vertical and lateral limits of aquifers containing 3,000 mg/l and 10,000 mg/l TDS water quality levels, above and below the injection zone and direction of movement of the water in every underground drinking water source which may be affected by the proposed injection.

(f) Maps and cross sections detailing geologic structure for the local area and generalized maps and cross sections illustrating the regional geologic setting.

(g) Description of chemical, physical, and biological properties and characteristics of the fluid to be injected.

(NOTE.—Comment is solicited on the impact of this requirement. Since some information involves trade secrets, how can confidentiality be protected without unduly restraining public involvement?(1)

(h) Volume, injection rate and injection pressure of the fluid to be injected.

(i) The following geological and physical characteristics of the injection interval and the overlying and underlying confining beds:

- (1) Thickness;
- (2) Areal extent;
- (3) Lithology;

(4) Location, extent and effects of known or suspected faulting, fracturing and natural solution channels;

(5) Formation fluid chemistry, including total dissolved solids; and

(6) Fracturing gradients.

(j) The following engineering data:

(1) Diameter of hole and total depth of the well;

(2) Type, size, weight, and strength of all casing strings;

(3) Proposed cementing procedures and type of cement;

(4) Proposed formation testing program;

(5) Proposed stimulation program;

(6) Proposed injection procedure;

(7) Plans of the surface and subsurface construction details of the system including engineering drawings;

(8) Plans for monitoring both well head and annular fluid pressure, fluids being injected in injection zone and other aquifers;

(9) Expected changes in pressure, native fluid displacement and direction of movement of injected fluid; and

(10) Contingency plans to cope with all shut-ins or well failures to prevent endangerment of underground drinking water sources.

(k) A written evaluation of alternative disposal practices in terms of maximum environmental protection.

§ 146.25 Formulation of preliminary determination and draft UIC permits.

(a) The Director shall prepare a preliminary staff determination with respect to a UIC permit application in advance of public notice of the proposed issuance of a UIC permit. The preliminary determination shall include at least the following:

(1) A proposed determination to issue or deny a UIC permit for the injection described in the UIC permit application;

(2) Name and address of the applicant; name of the facility or operation producing the contaminants to be injected; site or proposed site of the injection; and a list of the alternatives to underground injection which have been considered;

(3) Proposed injection limitations for each major parameter; and

(4) A brief description of any proposed special conditions which will have significant impact upon the injection described in the application.

(b) The Director shall organize the tentative determination, prepared under (a) of this section into a draft UIC permit.

§ 146.26 Public notice of proposed issuance or denial of UIC permits for existing and new underground injections.

(a) The Director shall give public notice of any preliminary determination to issue or deny a UIC permit. The public notice shall be circulated in a manner designed to inform interested persons of the proposed injection and of the preliminary determination to issue or deny a UIC permit for the proposed injection. At a minimum:

(1) The public notice shall be published in a local newspaper of general circulation;

(2) Notice shall be mailed to any person or group of persons upon request;

(3) The Director shall provide a period of not less than 30 days following the date of the public notice, during which time interested persons may submit written comments regarding the preliminary determination with respect to the UIC permit application. All written comments submitted during the comment period shall be retained by the Director and considered in the formulation of his final determination with respect to the UIC permit application.

(b) The contents of public notice of proposed issuance or denial of UIC permits shall include at least the following:

(1) Name and address of the applicant and a brief description of the location of the injection;

(2) Nature of the applicant's activities or operations which result in the fluid

to be injected (e.g., municipal waste treatment plant, steel manufacturing, drainage from mining activities);

(3) A physical, chemical, and biological description of the fluid to be injected and the rate and pressure of injection;

(NOTE.—Comment is solicited on the impact of this requirement since some information involves trade secrets. How can confidentiality be protected without unduly restraining public involvement?)

(4) Depth and geologic name of the injection zone or formation;

(5) A statement of the Director's preliminary determination to issue or deny the permit and a brief description of the procedures for the formulation of final determinations, including the comment period and any other means by which interested persons may influence or comment upon those determinations; and

(6) Name of the State agency issuing the public notice with address and phone number at which interested persons may obtain further information, and inspect and copy UIC application forms and related documents.

§ 146.27 Notice to other government agencies.

The Director shall also notify other appropriate government agencies of the proposed issuance of a UIC permit and shall provide such agencies an opportunity to submit their written views and recommendations or request a public hearing. Procedures for such notification shall include the following:

(a) At the time of issuance of public notice under § 146.25, a copy of the notice will be transmitted to the Director in any other State whose waters may be affected by the issuance of a UIC permit and, upon request, such State will be provided with a copy of the UIC permit application and a copy of the proposed permit. Each potentially affected State may submit written recommendations to the Director (with copies to the Regional Administrator(s) for the affected Region(s)). The Director shall provide the affected State or States (and the Regional Administrator(s)) a written explanation of his reasons for failing to accept any such written recommendations;

(b) A procedure, similar to paragraph (a) of this section, for notifying any interstate agency or commission having ground-water quality control authority over waters which may be affected by the issuance of a permit; and

(c) A procedure for mailing a copy of the public notice of an application for a UIC permit to any other Federal, State, or local agency, or any foreign country, upon request, and providing an opportunity to respond, comment, or request a public hearing pursuant to § 146.29. Such agencies shall include at least the following:

(1) The agency responsible for the preparation of an approved plan under section 208(b)(2)(K) of the FWPCA; and

(2) The State or interstate agency responsible for the preparation of a plan pursuant to an approved continuous planning process under section 303(c)

of the FWPCA, unless such agency is under the supervision of the Director.

§ 146.23 Public hearings on existing and new underground injections.

(a) The Director shall provide an opportunity for the applicant, any affected State, any affected interstate agency, any affected country, the Regional Administrator, or any interested agency, person, or group of persons to request an informal public hearing with respect to a UIC permit application.

(b) The Director shall hold an informal public hearing on a permit application if he finds there is a significant public interest (including the filing of requests or petitions for such a hearing) in holding such a hearing. Any hearing held under this subsection shall be held in the geographical area of the injection or proposed injection, and may, as appropriate, consider related groups of permit applications.

§ 146.29 Public notice of hearings on existing and new underground injections.

(a) Public notice of any hearing held under § 146.28 shall be circulated at least as widely as was the notice of the UIC permit application and shall be given at least 30 days prior to the hearing date.

(b) The contents of the public notice of any hearing held under § 146.28 shall include at least the following:

(1) A brief description of the nature and purpose of the hearing, including rules and procedures to be followed;

(2) Name and address of the applicant whose application will be considered at the hearing;

(3) Name of formation into which injection is proposed, the injection depth, and a description of the location of the injection;

(4) A description of the fluid to be injected and the rate and pressure of injection;

(5) Nature of the applicant's activities or operations which result in the fluid to be injected (e.g., municipal waste treatment plant, steel manufacturing, drainage from mining activities);

(6) The date, time and location of the hearing;

(7) A concise statement of the issues raised by the person requesting the hearing; and

(8) Name of the agency holding the public hearing with address and phone number at which interested persons may obtain further information.

§ 146.30 Director action on UIC permit applications.

After considering the application for a permit for a new or existing underground injection and all pertinent matters relative thereto, if the Director finds that the applicant has demonstrated that the proposed well injection will not endanger underground drinking water sources, the Director may issue a permit. If the Director finds that the applicant has not demonstrated that the proposed well injection will not endanger underground drinking water sources, the Director shall issue a permit under § 146.21(a) (3). The

Director's decision shall be in writing, and a copy furnished to the applicant.

§ 146.31 Prohibited underground injection.

The Director shall insure that no permit shall be issued authorizing underground injection unless the applicant can demonstrate to the satisfaction of the Director that such injection will not endanger underground drinking water sources.

§ 146.32 Permit conditions and other requirements.

State procedures must insure that the terms and conditions of each issued UIC permit comply with the following:

(a) Adherence to any applicable more stringent limitations including those (i) necessary to meet both treatment standards and schedules of compliance, established under State law or regulation, or (ii) necessary to meet other Federal law or regulation;

(b) Allowance of no underground injection of contaminants until after:

(1) The use of appropriate techniques for construction, operation and maintenance of the injection system; and

(2) Provisions for inspection, monitoring, record-keeping and reporting of the underground injection operation;

(c) Allowance of no contaminant to enter an existing or potential underground drinking water source if the presence of such contaminant may endanger such drinking water source;

(d) Adequate contingency plans to cope with malfunctions or failure of the underground injection system;

(e) Adequate procedures for detecting failure of the system in a timely fashion;

(f) Provisions for such measures as the Director finds necessary to assure the availability of adequate financial resources for dealing with underground injection systems which either are improperly abandoned or may otherwise cause contamination of underground drinking water sources;

(g) That all injections authorized by the UIC permit shall be consistent with the terms and conditions of the permit and that the injection of any contaminant at a greater rate or pressure than that authorized by the permit, or a volume in excess of that authorized by the permit shall constitute a violation of the terms and conditions of the permit;

(h) That the permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to, the following:

(1) The underground injection endangers underground drinking water sources;

(2) Violation of any material terms or conditions of the permit;

(3) Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; or

(4) A change in any condition that may indicate failure of the underground injection system;

(i) That the permittee shall allow the Director or his authorized representative, upon the presentation of appropriate credentials:

(1) To enter the permittee's premises in which a contaminant source or injection system is located and in which any records are required to be kept under terms and conditions of the permit;

(2) To have access to and copy records required to be kept under terms and conditions of the permit;

(3) To inspect the permittee's facilities, including any monitoring equipment or analytical devices; and

(4) To sample any fluids being injected, and if sampling of the injection zone and other aquifers is required by the permittee under the monitoring plan of the permit, to also have the right to sample those zones;

(j) That the permittee at all times shall maintain in good working order and operate efficiently facilities or systems of control installed by the permittee to achieve compliance with terms and conditions of the permit;

(k) That immediately following the permanent cessation of underground injection or where a well is not completed, the permittee shall notify the Director and follow the procedures prescribed by the Director for plugging and abandonment; and

(l) That the permittee shall submit reports of all remedial work actions to the Director.

§ 146.33 Monitoring and record-keeping.

Each permittee shall keep on forms prescribed by the Director complete and accurate records of:

(a) All monitoring required in the permit which will include, but not be limited to:

(1) Weekly readings of the surface injection pressure;

(2) Weekly readings of the tubing—long string annulus pressure;

(3) Weekly total volume of injected fluid; and

(4) Weekly average injection volume (bbbls/day) (liters/day);

(b) All periodic well tests, including but not limited to:

(1) Water analyses;

(2) Measured or calculated bottom hole pressure readings of the injection zone; and

(3) Well conditions;

(c) All shut-in periods, times contingency measures used for handling the fluid to be injected;

(d) The permittee shall retain, for a period of five years, records of all information resulting from any monitoring activities required by the UIC permit or by regulation. This requirement shall continue in effect during the five year period following abandonment of the well. The period of retention shall be extended when requested by the Director; and

(e) Records of monitoring activities and results shall include for all samples: (1) the date, place and time of sampling; (2) the dates analyses were performed; (3) who performed the analyses; (4) the analytical techniques/methods; and (5) the result of such analyses.

§ 146.34 Reporting requirements.

(a) Each permittee shall submit at least the following reports or notifica-

tion to the Director on forms prescribed by the Director:

(1) Notification of the initial injection operation within ten days of the start-up date; and

(2) Quarterly reports which contain the data records required by the Director.

(b) Within ten days after the temporary discontinuance of disposal operations, the permittee shall notify the Director of the date and length of such discontinuance and the reason therefor. The Director will prescribe appropriate procedures to insure that underground drinking water sources are protected.

Subpart D—Requirements Applicable to Injection Wells Related to Oil and Gas Production

§ 146.40 Underground injections to which subpart applies.

This subpart sets forth requirements for State programs with respect to the underground injection of brine or other fluids which are brought to the surface in connection with oil or natural gas production; and underground injection for the secondary or tertiary recovery of oil or natural gas.

§ 146.41 Review of existing underground injections.

(a) Underground injections which were in operation under approval by the Director under an existing State program before the approval of the proposed State program under section 1422(b) of the Act may, for a period of up to five years, after approval, be regulated by rule provided such underground injections will not endanger underground drinking water sources.

(1) The Director shall obtain data necessary to make the determinations required under § 146.42.

(2) The Director shall systematically review such underground injections to determine that they do not endanger underground drinking water sources. The approach for review may be by county, field, age of well or other systematic approach decided upon by the Director.

The method of review to be used must be indicated in the program submission to EPA along with a time schedule to assure that all existing underground injections will be reviewed within five years.

(3) Underground injections reviewed by the Director that do not endanger underground drinking water sources may continue operation under a permit issued in compliance with §§ 146.42 and 146.47.

(4) Underground injection operations that are found to endanger underground drinking water sources shall discontinue operation pending remedial action unless the Director determines that it is unreasonable or impracticable to discontinue operating pending remedial action. If the Director permits an endangering operation to continue pending remedial action the Director shall prescribe a compliance schedule which shall require remedial action to be taken as soon as practicable but in no case later than one

year following the determination of endangerment.

(b) Pending review by the Director, underground injections must comply with State rules in effect on the date of proposal of the program.

(NOTE.—Comment is solicited on the practicality and impact of this regulator approach.)

§ 146.42 Requirements for existing and new underground injections.

(a) The Director shall review data on existing underground injection and on proposed new underground injections to assure that:

(1) All underground drinking water sources of 3,000 mg/l total dissolved solids or less are protected by surface casing cemented to the surface;

(2) Injection is maintained through tubing with a suitable packer set immediately above the injection zone;

(3) The long string is cemented with sufficient cement to assure no migration of injected fluid above or below the injection zone;

(4) There are no leaks in the system;

(5) Surface injection pressure is limited to preclude the possibility of fracturing the confining strata;

(6) All well completion and plugging reports for wells of record penetrating the proposed injection zone within a one-half mile radius of the proposed well injection have been thoroughly reviewed to insure that all wells are properly completed and/or plugged that in the judgment of the Director present a potential threat to underground drinking water sources; and

(7) Annular injection between the casing and hole is not practiced.

(8) Annular injection between strings of casing and between tubing and casing is not practiced; except that in specific cases the Director may approve such annular injection providing: (i) there is an annulus between the outer string of casing receiving the injection and the surface casing which can and will be monitored for leaks; (ii) that the surface casing is protected by cement to the surface; and (iii) that the injector demonstrates to the satisfaction of the Director that the injection will not endanger underground drinking water sources.

(9) Annular injection between the surface casing and the next innermost casing or between the surface casing and the tubing, or injection through the surface casing only, is not practiced; except that in specific cases the Director may approve such injection where: (i) the injection was in operation prior to approval of the proposed State program, and (ii) the injector demonstrates to the satisfaction of the Director that, based on previous history and presentation of compelling evidence collected through fluid injection profile surveys and/or monitoring wells that the injection has not endangered underground sources of drinking water, nor will continued use endanger underground sources of drinking water.

(b) The Director may designate specific areas in the State where an alternative method of protection to those required

in paragraphs (a) (1) and (2) of this section has been used and has been demonstrated to be equally effective in the prevention of endangerment to underground drinking water sources provided:

(1) A complete record of all evidence, as well as all analyses of such evidence relative to a designation under this paragraph is submitted to the Administrator upon submission of the State program under section 1422(b) of the Act.

(2) All injection wells located in the designated area and the alternative to be used are identified as a part of the submission to the Administrator. Such designations are subject to the approval of the Administrator and the public hearing requirements of § 146.10(g) and 146.14 (a). If an area is to be designated after approval of the State program the procedure contained in this paragraph must be followed.

(c) The Director may approve an alternative method of protection for a specific well or injection in lieu of those required in paragraphs (a) (1), (2), and (3) provided:

(1) The injector can demonstrate to the Director with written compelling evidence that that specific requirement would interfere with or impede oil and gas production from the production well(s) serviced by that specific injection well;

(2) The injector can demonstrate to the Director with written compelling evidence that that specific requirement is not essential to prevent endangerment to underground drinking water sources resulting from that specific injection;

(3) The injector provides a written assessment of the alternative method of protection to be used; and

(4) The Director provides the opportunity for informal public hearing on that specific well or injection.

(NOTE.—Comment is solicited on the adequacy of these requirements in preventing endangerment to underground drinking water sources, and of the impact on existing wells.)

§ 146.43 Public notice of proposed issuance or denial of UIC permits for existing and new underground injections.

(a) The Director shall give public notice of the intent to issue or deny UIC permits for those existing and new underground injections reviewed under §§ 146.41 and 146.47. The public notice may contain more than one underground injection facility. The approach may be similar to that in § 146.41(a) (3). The public notice shall be circulated in a manner designed to inform interested persons of the proposed injection and of the determination to issue or deny a UIC permit for the proposed injection. Procedures for the circulation of public notices shall include at least the following:

(1) Notice shall be circulated within the geographical area of the proposed injection by publication in a local newspaper of general circulation;

(2) Notice shall be mailed to any person or group upon request;

(3) The Director shall provide a period of not less than 30 days following the date of the public notice, during which time interested persons may submit written comments regarding the determination to issue or deny the UIC permit for an existing underground injection. All written comments submitted during the 30 days comment period shall be retained by the Director and considered in the formation of his final determination with respect to the UIC permit application.

(4) The Director shall provide a period of not less than 14 days following the date of the public notice, during which time interested persons may submit written comments regarding the determination to issue or deny the UIC permit for new underground injections. All written comments submitted during the 14 days comment period shall be retained by the Director and considered in the formation of his final determination with respect to the UIC permit application.

(b) The contents of public notice of issuance or denial of UIC permits shall include at least the following:

(1) Ownership and location data.

(i) Operator of injection well or project; and

(ii) Location by geographic area, or section, township, and range.

(2) Engineering Data.

(i) Purpose of Injection (Disposal, Recovery);

(ii) Estimated volume and type of fluid to be injected (by lease, pool, field or other suitable means); and

(iii) Number of injection wells.

(3) Depth and geologic name of the injection zone or formation;

(4) A statement of the Director's determination to issue or deny the permit and a brief description of the procedures for the formulation of final determinations, including the comment period and any other means by which interested persons may influence or comment upon those determinations; and

(5) Name of the State agency issuing the public notice with address and phone number at which interested persons may obtain further information, and inspect and copy UIC application forms and related documents.

§ 146.44 Notice to other government agencies.

The Director shall also notify other appropriate government agencies of the proposed issuance of a UIC permit and shall provide such agencies an opportunity to submit their written views and recommendations or request a public hearing. Procedures for such notification shall include the following:

(a) At the time of issuance of public notice under § 146.43, a copy of the notice will be transmitted to the Director in any other State or Territory whose waters may be affected by the issuance of a UIC permit and, upon request, such State will be provided with a copy of the UIC permit application and a copy of the proposed permit. Each potentially affected State or Territory may submit written

recommendations to the Director (with copies to the Regional Administrator(s) for the potentially affected Region(s)). The Director shall provide the affected State or States (and the Regional Administrator(s)) a written explanation of his reasons for failing to accept any such written recommendations;

(b) A procedure, similar to paragraph (a) of this section, for notifying any interstate agency or commission having ground-water quality control authority over waters which may be affected by issuance of a permit; and

(c) A procedure for mailing a copy of the public notice of an application for a UIC permit to any other Federal, State, or local agency, or any foreign country, upon request, and providing an opportunity to respond, comment, or request a public hearing under § 146.46. Such agencies shall include at least the following:

(1) The agency responsible for the preparation of an approved plan under section 208(b) (2) (K) of the FWPCA, and

(2) The State or interstate agency responsible for the preparation of a plan pursuant to an approved continuous planning process under section 303(e) of the FWPCA, unless such agency is under the supervision of the Director.

§ 146.45 Public hearings on existing and new underground injections.

(a) The Director shall provide an opportunity for the applicant, any affected State, any affected interstate agency, any affected country, the Regional Administrator, or any interested agency, person, or group of persons to request an informal public hearing with respect to a UIC permit application.

(b) The Director shall hold an informal public hearing on a permit application if he finds there is a significant public interest (including the filing of requests or petitions for such hearing) in holding such a hearing. Any hearing held under this subsection shall be held in the geographical area of the injection or proposed injection, and may, as appropriate, consider related groups of permit applications.

§ 146.46 Public notice of hearings on existing and new underground injections.

(a) At least 14 days prior to a public hearing held under § 146.45, the Director shall give notice of such hearing by publication in a newspaper of general circulation within the geographical area of the proposed injection and shall set forth the following:

(1) Ownership and location data.

(i) Operator of injection well or project; and

(ii) The location of the injection well or project by section, township and range, or by a location from the nearest village or town, or in such other manner as will identify the geographical area involved.

(2) Engineering Data.

(i) Purpose of injection (disposal, recovery);

(ii) Volume and type of fluid to be injected; and

(iii) Number of injection wells involved;

(3) Depth and geologic name of the injection zone or formation;

(4) A concise statement of the issues raised by the person requesting the hearing;

(5) The name of the agency issuing the notice and the date, time, and location of the hearing;

(b) The Director shall further supply the information set out above to each State, interstate or Federal agency and to each person or group of persons expressing an interest in the permit to be considered at a hearing.

§ 146.47 Application for UIC permit for a new underground injection.

An application for a UIC permit for a new underground injection shall be filed with the Director on forms prescribed by the Director.

(a) The application form for any new underground injection shall include the following:

(1) Ownership and Location Data. The application shall identify the owner and operator of the proposed underground injection facility, and the location of the facility;

(2) Engineering Data.

(i) A detailed casing and cementing program, or a schematic showing: diameter of hole, total depth of well and ground surface elevation; surface, conductor, and long string casing size and weight, setting depth, top of cement, method used to determine top; tubing size, and setting depth, and method of completion (open hole or perforated);

(ii) A map showing name and location of all producing wells, injection wells, abandoned wells, dry holes, and water wells of record within a one-half mile radius of the proposed injection well; and

(iii) A tabulation of all wells requested under (ii) penetrating the proposed injection zone, showing: operator; lease; well number; surface casing size and weight, depth and cementing data; intermediate casing size and weight, depth and cementing data; long string size and weight, depth and cementing data; and plugging data.

(NOTE.—Comment is solicited on other ways to demonstrate non-endangerment from wells penetrating the proposed injection zone where it is possible that the wells may be an open connection to an underground drinking water source.)

(3) Operating Data.

(i) Depth to top and bottom of injection zone;

(ii) Anticipated daily injection volume, minimum and maximum, in barrels;

(iii) Approximate injection pressure; and

(iv) Type, source and characteristics of injected fluids.

(4) Geologic Data—Injection Zone. Appropriate geologic data on the injection zone and confining beds including such data as geologic names, thickness and areal extent of the zone.

(5) Underground Sources of Drinking Water Which May be Affected by the

Injection. Geologic name and depth (below land surface) of aquifers above and below the injection zone containing water of 3,000 mg/l total dissolved solids or less and aquifers containing water of 10,000 mg/l total dissolved solids or less.

(6) An electric log on all new wells and on existing wells where available.

(b) The Director may request any of these additional data necessary to make the determinations required in § 146.41.

(1) Engineering Data.

(i) Method to determine rate of corrosion;

(ii) Cement bond log;

(iii) List of all cement squeeze operations, giving interval and number of sacks of cement;

(2) Operating Data.

(i) Whether open or closed system;

(ii) Contingency plans to cope with all shut-ins or well failures;

(3) Geologic Data—Regional Structure. Location, extent and effects of known or suspected faulting, indicating whether faults are sealed or fractured avenues for fluid movement;

(4) Underground Sources of Drinking Water. Lithology of aquifers defined as underground sources of drinking water;

(5) Any surface retention facilities associated with the injection operation;

(6) Reservoir and Fluid Data on Entire Reservoir.

(i) Lithology;

(ii) Original and current bottom hole pressure;

(7) Reservoir and Fluid Data on Lease.

(i) Average horizontal permeability;

(ii) Average porosity;

(8) Production history of reservoir;

(9) Type of injection project and results expected; and

(10) Injection pattern and spacing.

§ 146.48 Permit conditions and other requirements.

State procedures must insure that the terms and conditions of each issued UIC permit including each permit for an existing underground injection, comply with the following:

(a) Adherence to any applicable, more stringent limitations including those (i) necessary to meet treatment standards, or schedules of compliance, established pursuant to State law or regulation, or (ii) necessary to meet other Federal law or regulation;

(b) Allowance of no underground injection of contaminants until after:

(1) The use of appropriate techniques for operation and maintenance of the injection system; and

(2) Provisions have been completed for inspection, monitoring record-keeping and reporting of the underground injection operation;

(c) Allowance of no contaminant to enter an underground drinking water source if the presence of such contaminant may endanger such drinking water source;

(d) Adequate contingency plans to cope with malfunctions or failure of the underground injection system;

(e) Adequate procedures for detecting failure of the system in a timely fashion;

(f) Provisions for such measures as the Director finds necessary to assure the availability of adequate financial resources for dealing with underground injection systems which either are improperly abandoned or may otherwise cause contamination of underground drinking water sources;

(g) That all injections authorized by the UIC permit shall be consistent with the terms and conditions of the permit and that the injection of any contaminant at a greater rate of pressure than that authorized by the permit, or a volume in excess of that authorized by the permit shall constitute a violation of the terms and conditions of the permit;

(h) That the permit may be modified, suspended, or revoked in whole or in part during its term for cause including but not limited to, the following:

(1) The underground injection endangers underground drinking water sources;

(2) Violation of any material terms or conditions of the permit;

(3) Obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; or

(4) A change in any condition that may indicate failure of the underground injection system;

(i) That the permittee shall allow the Director or his authorized representative, upon the presentation of appropriate credentials:

(1) To enter permittee's premises in which a contaminant source or injection system is located and in which any records are required to be kept under terms and conditions of the permit;

(2) To have access to and copy records required to be kept under terms and conditions of the permit;

(3) To inspect the permittee's facilities, including any monitoring equipment or analytical devices; and

(4) To sample any fluids being injected and if sampling of the injection zone and other aquifers is required by the permittee under the monitoring plan of the permit, to also have the right to sample these zones;

(j) That the permittee at all times shall maintain in good working order and operate efficiently the facilities or systems of control installed by the permittee to achieve compliance with terms and conditions of the permit;

(k) That immediately following the permanent cessation of underground injection or where a well is not completed the applicant shall notify the Director and follow the procedures prescribed by the Director for plugging and abandonment; and

(l) That the permittee shall report all remedial work to the Director.

§ 146.49 Monitoring and record-keeping.

Each permittee shall keep on forms prescribed by the Director complete and accurate records of:

(a) All monitoring required in the permit which will include, but not be limited to:

(1) Weekly readings of the surface injection pressure;

(2) Weekly readings of the tubing—long string annulus pressure;

(3) Weekly total volume of injected fluid; and

(4) Weekly average injection volume (bbls/day) (liters/day);

(b) All periodic well tests, including but not limited to:

(1) Water analyses; and

(2) Well conditions;

(c) The permittee shall retain, for a period of five years, records of all information resulting from any monitoring activities required by the UIC permit or by regulation. This requirement shall continue in effect during the five-year period following abandonment of the well. The period of retention shall be extended when requested by the Director; and

(d) Records of monitoring activities and results shall include for all samples: (1) the date, place and time of sampling; (2) the dates analyses were performed; (3) who performed the analyses; (4) the analytical techniques/methods; and (5) the results of such analyses.

§ 146.50 Reporting requirements.

(a) Each permittee shall submit at least the following reports or notification to the Director on forms prescribed by the Director:

(1) Notification of the initial injection operation within ten days of the start-up date; and

(2) Quarterly reports which contain the data records required by the Director.

(b) Within ten days after the temporary discontinuance of disposal operations the permittee shall notify the Director of the date and length of such discontinuance and reason therefor. The Director will prescribe appropriate procedures to insure that underground drinking water sources are protected.

Subpart E Requirements Applicable to All Drainage Wells

§ 146.70 Underground injections to which subpart applies.

This subpart sets forth requirements for State programs with respect to drainage wells used. Underground injections covered by this subpart include injections to dispose of storm water runoff, irrigation return flow, and excess ponded surface waters.

§ 146.71 Regulation by rule or permit.

A State program may regulate any category of underground injection covered by this subpart by rule or by permit system, at the option of the State.

§ 146.72 Regulation by permit.

If a State elects to regulate a category of underground injection covered by this subpart by permit, the permit requirements must include, as a minimum:

(a) That the applicant for the permit to inject must provide such information as the State may require regarding location and design of the facility, nature and volume of the fluid to be injected, and such other information as may be necessary to satisfy the State that the

underground injection will not endanger underground drinking water sources.

(b) That the Director will give public notice and provide opportunity for comment, and informal public hearing in cases where the Director determines that the application raises substantial question of possible endangerment of underground drinking water sources.

(c) That permits issued will be conditioned on compliance with specified inspection, monitoring, record-keeping and reporting requirements.

§ 146.73 Regulation by rule.

If a State elects to regulate a category of underground injection covered by this subpart by rule, the State regu-

lations applicable to that category shall provide, but not be limited to, the following:

(a) That no underground injection that endangers underground drinking water sources is authorized;

(b) A mechanism for determining the nature and extent of the underground injection activity in the State;

(c) A mechanism for insuring that periodic testing is conducted and test records are maintained in appropriate cases; and

(d) That design, location or construction of underground injection facilities that would be inconsistent with good practice for the protection of underground drinking water sources is prohibited.

§ 146.74 Remedial action.

Underground injection operations that are found to endanger underground drinking water sources shall discontinue operation pending remedial action unless the Director determines that it is unreasonable or impracticable to discontinue operating pending remedial action. If the Director permits an endangering operation to continue pending remedial action, the Director shall prescribe a compliance schedule which shall require remedial action to be taken as soon as practicable but in no case later than one year following the determination of endangerment.

APPENDIX B

STATE OF NEW YORK
DEEP WELL INJECTION POLICY

DEEP WELL INJECTION

Statement of Policy

- A. The injection of liquid wastes by deep wells is considered a last resort after all other methods have been evaluated; it is a method for gaining long-term storage rather than treatment. The applicant must demonstrate that this method (1) is the optimal approach, and (2) has the least effect to the total environment.
- B. Fresh ground waters and potential mineral resources which may be subject to future development must be protected against any adverse effect by the disposal of wastes into the sub-surface.
- C. It is incumbent upon the applicant to obtain a competent geologist and a professional engineer for the necessary studies, design and preparation of reports and plans. This should include, but not be limited to the environmental, economical and technical implications.
- D. Continuous injection at critical input (hydraulic parting) pressures is prohibited and will not be approved.
- E. A permit must be issued prior to the construction and operation of any disposal of wastes through deep well injection.
- F. Concurrence must be obtained from the Division of Oil and Gas of the Conservation Department and the office of the State Geologist of the Education Department.

May 29, 1969

APPENDIX C

PART 703

GROUNDWATER CLASSIFICATIONS AND STANDARDS
(SECTION 17-0301, TITLE 6, NEW YORK CODE)

SOURCE: ENVIRONMENT REPORTER, BNA, 1-17-75.

PART 703

Ground Water Classifications and Standards

(Statutory authority: Public Health Law, § 1205)

Sec.

- 703.1 Basis of classification
- 703.2 Definitions
- 703.3 Conditions
- 703.4 Classes and standards for ground waters
- 703.5 Assignment of ground water classifications and standards

Section 703.1 Basis of classification. (a) The ground waters of the State are classified according to best use, and all fresh ground waters are best used as sources of potable water supply. Such fresh waters, when subjected to approved disinfection treatment and/or additional treatment to reduce naturally present impurities to meet New York State Health Department drinking water standards are deemed satisfactory for potable purposes.

(b) The purpose of these classes and standards is to prevent pollution of ground waters and protect the ground waters for use as a potable water. The concentration listed in schedule I and II represent maximum allowable concentrations.

(c) Modifications of specific concentration of the constituents in schedule I and II and all toxic chemicals may be required where accumulative and synergistic effects can be established.

703.2 Definitions. For the purposes of these classifications and standards:

(a) *Fresh water* is that water having a chloride content equal to or less than 250 mg/l, or a total dissolved solids content equal to or less than 1000 mg/l.

(b) *Saline water* is that water having a chloride content of more than 250 mg/l, or a total dissolved solids content of more than 1000 mg/l.

(c) *Ground waters* are those waters in the zone of saturation.

(d) The *zone of saturation* is that extensive portion of the earth's crust which is saturated with water. (Does not include isolated perched water areas.)

(e) The *zone of aeration* is that portion of the earth's crust which is *above* the natural ground water table.

- (f) *Unconsolidated deposits* are all soil materials above the bed rock.
- (g) *Consolidated rock* or *bed rock* is the compact hard rock below the unconsolidated deposits.
- (h) *Potable waters* are those fresh waters usable for drinking, culinary or food processing purposes.
- (i) *Mg/l* is the weight in milligrams of any specific item or items in a liter of the solution containing the item or items.
- (j) *Point of discharge* is point of initial contact of waste with the existing earth, soil or rock.
- (k) *Water table* is the top of the zone of saturation. It fluctuates with seasons and is usually lowest in September or October.

703.3 Conditions. (a) Where natural fresh ground waters contain quantities of any chemical constituents in excess of standards set forth in schedule II, such water when removed from the zone of saturation and so used as not to be altered biologically and not to be unreasonably altered chemically or physically, may be discharged to the zone of aeration or returned directly to the zone of saturation.

(b) Class GSB will be assigned only by the Water Resources Commission after a public hearing and a thorough study to determine that such a class is required for a specific subsurface area, and to insure protection of adjacent and tributary ground waters.

(c) These classes and standards shall not be deemed to apply to the utilization of chemicals and fertilizers in normal accepted agricultural pursuits.

703.4 Classes and standards for ground waters.

CLASS GA

Fresh ground waters which are best used as sources of potable water supply. (Found in the zone of saturation of unconsolidated deposits and consolidated rock or bed rock)

Quality Standards for Class GA Waters

- Condition I:* Fresh waters found where the top of the zone of saturation (water table) is in the unconsolidated deposits and total thickness of unconsolidated deposit is not less than 15 feet of which not less than 10 feet of unconsolidated deposit is in the zone of saturation at any time.
- Items:* 1. Raw or treated sewage, industrial wastes or ineffectively treated effluents, taste or odor producing substances, toxic wastes, thermo-wastes, radioactive substances, or other deleterious matter.
- Specifications:* 1. *None* into the zone of aeration which may impair the quality of the ground waters to render them unsuitable for a potable water supply. The concentration of various contaminants shall not exceed the standard set forth in schedule I at the point of discharge.
2. *None* into the zone of saturation which may impair the quality of the ground water to render them unsuitable for a potable water supply.
- (a) Where discharge is in the unconsolidated deposits, the concentration of various contaminants at the point of

- discharge shall not exceed the standards set forth in schedule I, provided that the point of discharge is not less than 10 feet above the consolidated rock.
- (b) Where discharge is in the consolidated rock or within 10 feet of consolidated deposits, the concentration of various contaminants at the point of discharge shall not exceed the standards set forth in schedule II.
- Condition II:* Fresh waters found where the top of the zone of saturation (water table) is in the consolidated rocks or where the top of the zone of saturation is in the unconsolidated deposits and the minimum thickness of the zone of saturation in these deposits is less than 10 feet at any time.
- Items:* 1. Raw or treated sewage, industrial wastes or ineffectively treated effluents, taste or odor producing substances, toxic wastes, thermo-wastes, radioactive substances, or other deleterious matter.
- Specifications:* 1. *None* into the zone of aeration which may impair the quality of the ground waters to render them unsuitable for a potable water supply. The concentration of various contaminants shall not exceed the standard set forth in schedule II at the point of discharge.
2. *None* into the zone of saturation which may impair the quality of the ground water to render them unsuitable for a potable water supply. The concentration of various contaminants shall not exceed the standards set forth in schedule II at the point of discharge.

Schedule I

- Analytical determinations.* Conformance with the requirements of these standards shall be analytically determined on the basis of an accepted method approved by the New York State Department of Health.
- Biological organisms.* Biological organisms shall not be allowed in amounts sufficient to render the water detrimental to public health, safety and welfare.
- Physical characteristics.* To conform with these standards, the arithmetic average of all samples examined in any month shall not exceed the following:
1. *Color – 30 units:* water, which when compared visually with a sample of known color concentration or with special calibrated color discs, matches the known standards of 30 color units.
2. *Threshold odor – 6:* water, a 35 ml sample of which when diluted with odor free water to a volume of 200 ml has no detectable odor.
- Chemical characteristics.* To conform with these standards, the following values shall not be exceeded:

Substance	Concentration in mg/l
Alkyl benzene sulfonate (ABS)	1.5
Arsenic (As)	0.1
Barium (Ba)	2.0
Cadmium (Cd)	0.02
Carbon chloroform extract residue (CCE)	0.4
Chloride (Cl)	500
Chromium (hexavalent) (Cr+6)	0.10
Copper (Cu)	0.4
Cyanide (CN)	0.4
Fluoride (F)	3.0

Substance	Concentration in mg/l
Iron (Fe)*	0.6
Lead (Pb)	0.10
Manganese (Mn)*	0.6
Nitrate (N)	20.0
Phenols	0.002
Selenium (Se)	0.02
Silver (Ag)	0.10
Sulfate (SO ₄)	500
Total dissolved solids	1000
Zinc	0.6
pH**	6.5—8.5

*Combined concentration of iron and manganese shall not exceed 0.6 mg/l.

**When natural ground waters have a pH outside of range indicated above, that natural pH may be one extreme of the allowable range.

Schedule II

Analytical determinations. Conformance with the requirements of these standards shall be analytically determined on the basis of an accepted method approved by the State Department of Health.

Bacteriological characteristics. To conform with these standards, the number of organisms of the coliform group shall not exceed the following:

1. An arithmetic average of 50 coliform organisms per 100 milliliter sample in a series of four or more samples collected during any 30-day period.

2. A count of 50 coliform organisms per 100 milliliter samples is not more than 20 per cent of the samples collected during the period.

Biological organisms. Biological organisms shall not be allowed in amounts sufficient to render the water unsafe or otherwise objectionable, as determined by the State Commissioner of Health.

Physical characteristics. To conform with these standards, the arithmetic average of all samples examined by any month shall not exceed the following:

1. *Color — 15 units:* water, which when compared visually with a sample of known color concentration or with special calibrated color discs, matches the known standards of 15 color units.

2. *Threshold odor — 3:* water, a 70 ml sample of which when diluted with odor free water to a volume of 200 ml has no detectable odor.

Chemical characteristics. To conform with these standards, the following values shall not be exceeded:

Substance	Concentration in mg/l
Alkyl benzene sulfonate (ABS)	1.0
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Carbon chloroform extract residue (CCE)	0.2
Chloride (Cl)	250
Chromium (hexavalent (Cr+6))	0.05
Copper (Cu)	0.2
Cyanide (CN)	0.2
Fluoride (F)	1.50

Substance	Concentration in mg/l
Iron (Fe)*	0.3
Lead (Pb)	0.05
Manganese (Mn)*	0.3
Nitrate (N)	10.0

*Combined concentration of iron and manganese shall not exceed 0.3 mg/l.

Substance	Concentration in mg/l
Phenols	0.001
Selenium (Se)	0.01
Silver (Ag)	0.05
Sulfate (SO ₄)	250
Total dissolved solids	500
Zinc	0.3
pH**	6.5—8.5

**When natural ground waters have a pH outside of range indicated above, that natural pH may be one extreme of the allowable range.

CLASS GSA

Waters of GSA classification are those saline ground waters wherever found in the zone of saturation which are best used as a source of saline waters for potable mineral waters, for conversion to fresh potable waters, or as raw material for the manufacture of sodium chloride or its derivatives or similar products.

Items: 1. Sewage or industrial wastes or ineffectively treated effluents; taste or odor producing substances, toxic wastes, thermo-wastes, radioactive substances, or other deleterious matter.

Specifications: 1. *None* in such manner or amount as to impair the waters for use as sources of saline water for the best usage outlined above.

CLASS GSB

Waters of the GSB classification are those saline waters in the zone of saturation having a chloride content in excess of 1,000 milligrams per liter or a total dissolved solids content of over 2,000 milligrams per liter wherever found, which are best used as receiving waters for disposal of wastes.

Items: 1. Sewage and all other wastes.

Specifications: 1. *None* which are detrimental to public health, safety or welfare and only on permit of the State agency having jurisdiction.

703.5 Assignment of ground water classifications and standards. The ground water classifications and standards enumerated in section 703.4 of Part 703 are assigned to all the ground waters of the State of New York, except those ground waters within Newtown Creek Drainage Basin in the Counties of Chemung and Schuyler to which the ground water classifications and standards were duly assigned on December 7, 1967.

APPENDIX D

MARYLAND GROUNDWATER QUALITY STANDARDS

(REGULATION 08.05.04.04 -

GROUNDWATER QUALITY STANDARDS;

EFFECTIVE SEPTEMBER 1, 1974)

SOURCE: ENVIRONMENT REPORTER, BNA

MARYLAND GROUNDWATER QUALITY STANDARDS

(Regulation 08.05.04.04 – Groundwater Quality Standards; Effective September 1, 1974)

A. DISCHARGE APPROVAL REQUIRED

(1) Any discharge* or disposal of waters or waste-waters* into the underground waters* of the State will require the approval of the Water Resources Administration*. Such approval, if granted, will contain such limitations and requirements as deemed necessary by the Water Resources Administration to protect the public health and welfare and to prevent pollution* of ground and surface waters. Prior to any approval, the Water Resources Administration may seek the advice and concurrence of the State Department of Health and Mental Hygiene.

(2) A State Discharge Permit shall be required for:

- a. Wastewater effluents disposed of by means of spray or other land irrigation systems;
- b. Groundwater recharge systems;
- c. Discharge of leachate from a sanitary landfill to surface or ground waters; and
- d. Other subsurface sewage disposal systems not specifically exempted in this regulation.

(3) A State Discharge Permit shall not be required for:

- a. Sanitary landfills requiring a permit from the State Department of Health and Mental Hygiene except as indicated in (2) c above; and
- b. Subsurface sewage disposal systems utilizing soil absorption and regulated by the State Department of Health and Mental Hygiene.

B. AQUIFER TYPES IDENTIFIED

For the purpose of controlling the pollution of the groundwaters of the State, the Water Resources Administration has identified three aquifer* types and has established standards for groundwater quality, as follows:

(1) *Type I Aquifer* means an aquifer having a transmissivity* greater than 1,000 gallons/day/foot and a permeability* greater than 100 gallons/day/square foot. In addition, the total dissolved solids concentration for natural* water in each aquifer shall be less than 500 mg/liter.

(2) *Type II Aquifer* means an aquifer having either: (a) a transmissivity greater than 10,000 gallons/day/foot, a permeability greater than 100 gallons/day/square foot and natural water with a total dissolved solids concentration of between 500 and 6,000 mg/liter; or (b) a transmissivity between 1,000 and 10,000 gallons/day/foot, a permeability greater than 100 gallons/day/square foot and natural water with a total dissolved solids concentration of between 500 and 1,500 mg/liter.

(3) *Type III Aquifer* means all aquifers other than Type I and Type II Aquifers.

C. DISCHARGE QUALITY ESTABLISHED

(1) *For Type I Aquifers:*

The characteristics or constituents of waters or waste-waters discharged into Type I Aquifers may not exceed, or cause the natural groundwater quality to exceed, mandatory or recommended standards for drinking water as established by the Federal Government.

(2) *For Type II Aquifers:*

The characteristics or constituents of waters or waste-waters discharged into Type II Aquifers may not exceed, or cause the natural groundwater quality to exceed, receiving (surface) water quality standards as established for Class I Waters by the State. In addition, the person* responsible for the discharge shall provide the Water Resources Administration with evidence that the discharge will not result in pollution of Type I Aquifers.

(3) *For Type III Aquifers:*

The characteristics or constituents of waters or waste-waters discharged into Type III Aquifers shall be identified to the Water Resources Administration, and evidence shall be provided to assure the Water Resources Administration that there will not be pollution of either Type I or Type II Aquifers or surface waters, and that the public health and welfare will not be endangered as a consequence of such disposal.

*The meaning of this term is described in Regulation 08.05.04.01 – DEFINITIONS [Environment Reporter – State Water Laws 801:0481]

